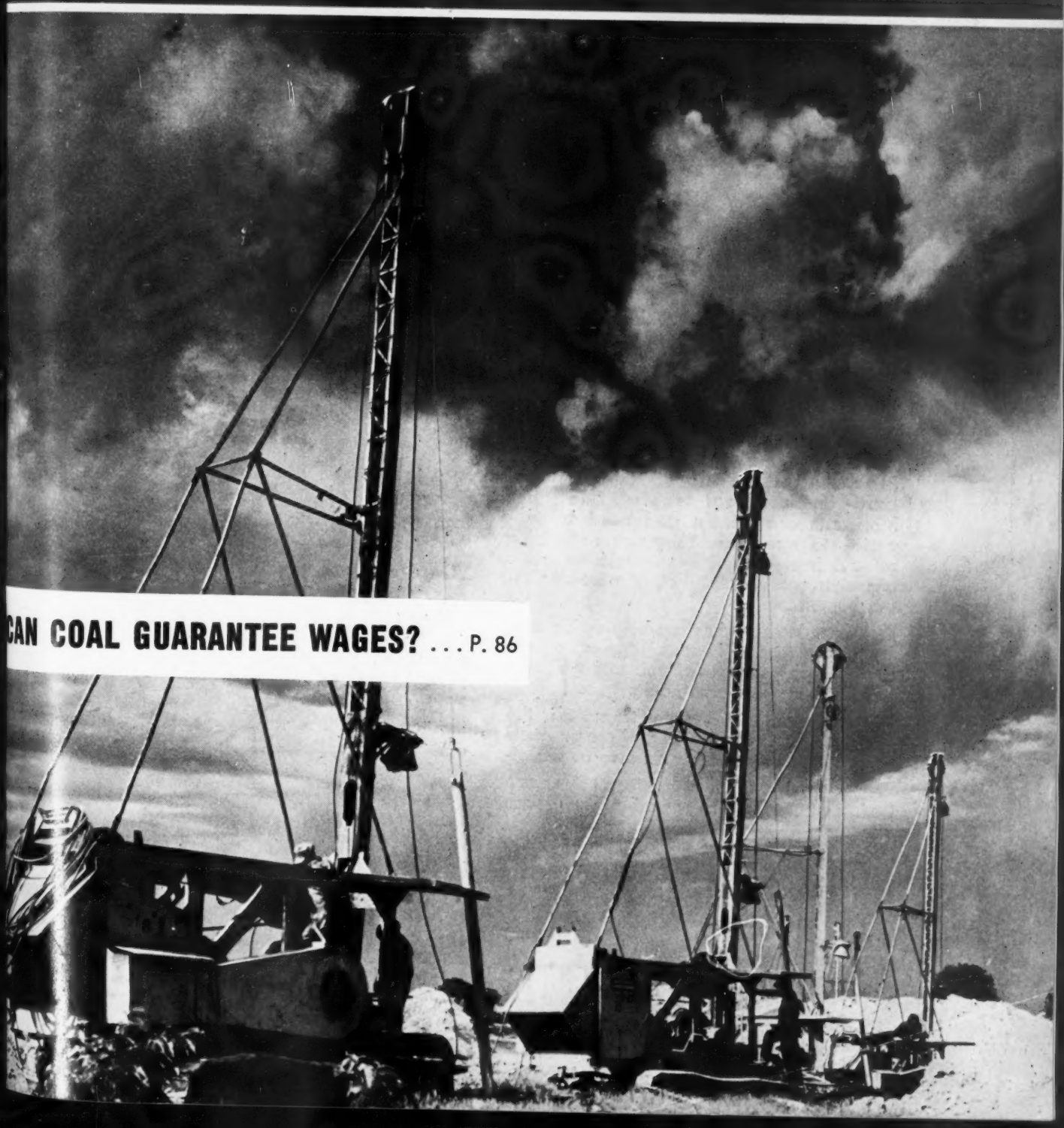
Coal Age

AUGUST, 1945



CAN COAL GUARANTEE WAGES? . . . P. 86

DIGGING UNDERGROUND ..."CUTTING OVERHEAD"

SUN MINE LUBRICANTS . . . Increase

Monthly Tonnage, Eliminate Shutdowns, Lower Maintenance-Costs, Save Man-Hours

In shaft mines and strippers throughout the hard- and soft-coal country, Sun mine lubricants are known and used by experienced operators. They are especially refined from chosen base-stocks to resist abrasion, washing, and other mine-operating conditions.

Cost-records show they are helping big and little operators to keep equipment going, to speed-up production, and to hold-down maintenance and man-hours.

A typical example of Sun performance is the West Virginia mine where Sun products saved 20% on the maintenance of wheel-bearings.

On loading-machines in one mine, Sun grease saved an estimated $1,600 a year.

In a Pennsylvania mine, a change to Sun grease made possible lubricating car-bearings every three months instead of every two weeks.

Wherever wear and tear are at work, wherever friction seizes moving parts and slows-down operations . . . on electrical equipment, turbines, Diesels, compressors, conveyors, graders, jack-hammers, draglines, trucks . . . Sun lubricants and Sun Engineers can help you. For full information on Sun's special mine-products and car-greases, call the Sun man near you, or write . . .

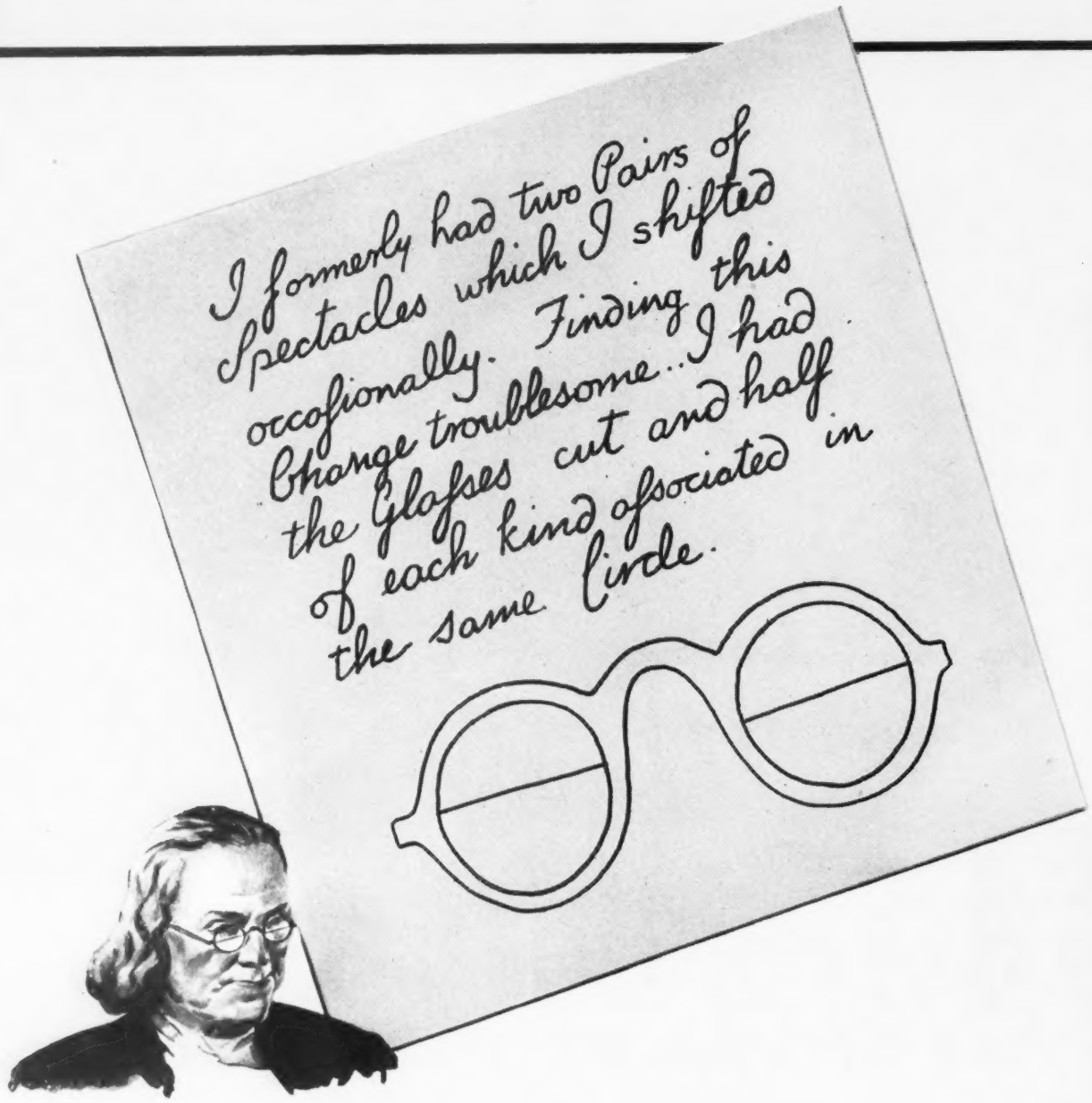
SUN OIL COMPANY • *Philadelphia 3, Pa.*

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

to do one thing and do it



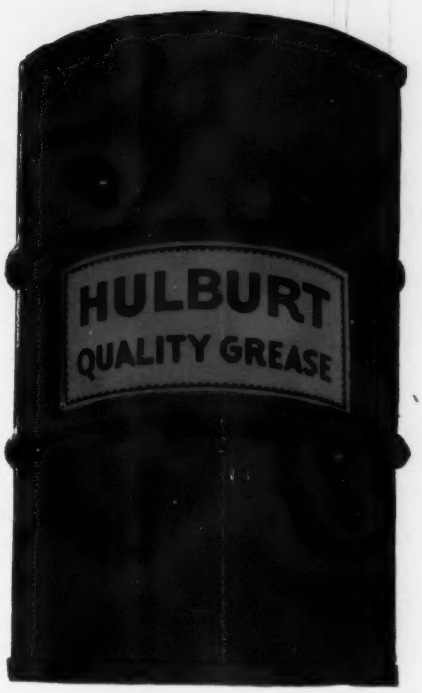
Invention of bifocal lens by Benjamin Franklin, in 1784, in Philadelphia, gave the great gift of youthful vision to generations of spectacle wearers . . . plus the convenience of one pair of glasses as a saving substitute for two!

Hulburt of Philadelphia, manufacturer of Quality Grease for 25 years, gave the coal industry a lubricating grease having *better Quality* because of the expert Engineering Service of Hulburt's staff — "Know-How" experience that produced a perfect grease for coal mine equipment!

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

SUPREMELY WELL



HULBURT *Quality* GREASE

Coal Age

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Volume 50 — **AUGUST, 1945** — *Number 8*

CHANGE OF ADDRESS

Director of Circulation, COAL AGE,
330 West 42d St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name .....

Old Address .....

New Address .....

New Company Connection .....

New Title or Position .....

HERE'S THE LOW-DOWN ON THE NEW 15 TON...

26 inch LOW-LINER

4" LOWER THAN A STANDARD DESK

The 26" Low-Liner, when applied to the widest track gauge normally found in mines can be built to the following specifications:

Track Gauge	48	inches
Wheel Base	85	inches
Frame Height	25⅞	inches
Width Over Frames	79½	inches
Length Over-all	21 ft., 1 in.	
Clearance—Rail to Frame	4½	inches
Clearance—Rail to Bumper	5½	inches
Clearance—Rail to Brake Cutout	9	inches
Clearance—Rail to Gear Case	2¼	inches
Clearance—Rail to Motor	2½	inches

The new Westinghouse "LOW-LINER" can operate in seams of a thickness formerly limited to gathering locomotives. Although it can be built only 26 inches high, important standard details of design and construction have been maintained... thus assuring dependable performance and easy maintenance.

The "LOW-LINER" has flush-frame construction for safety and ample equipment space; roller journal bearings with boxes which are removable without untracking the locomotive; leaf springs for smoother riding qualities; cross equalization for better tracking. Equipment and parts are arranged for easy access, which simplifies maintenance and inspection. For a locomotive that meets these low coal operating conditions and delivers maximum "on-the-job" haulage... it will pay you to investigate the Westinghouse "LOW-LINER".

For full details call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-15107

Westinghouse
PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

Mine Locomotives

RETOOL

with

COALMASTER DRILLING TOOLS

For Faster post War Production

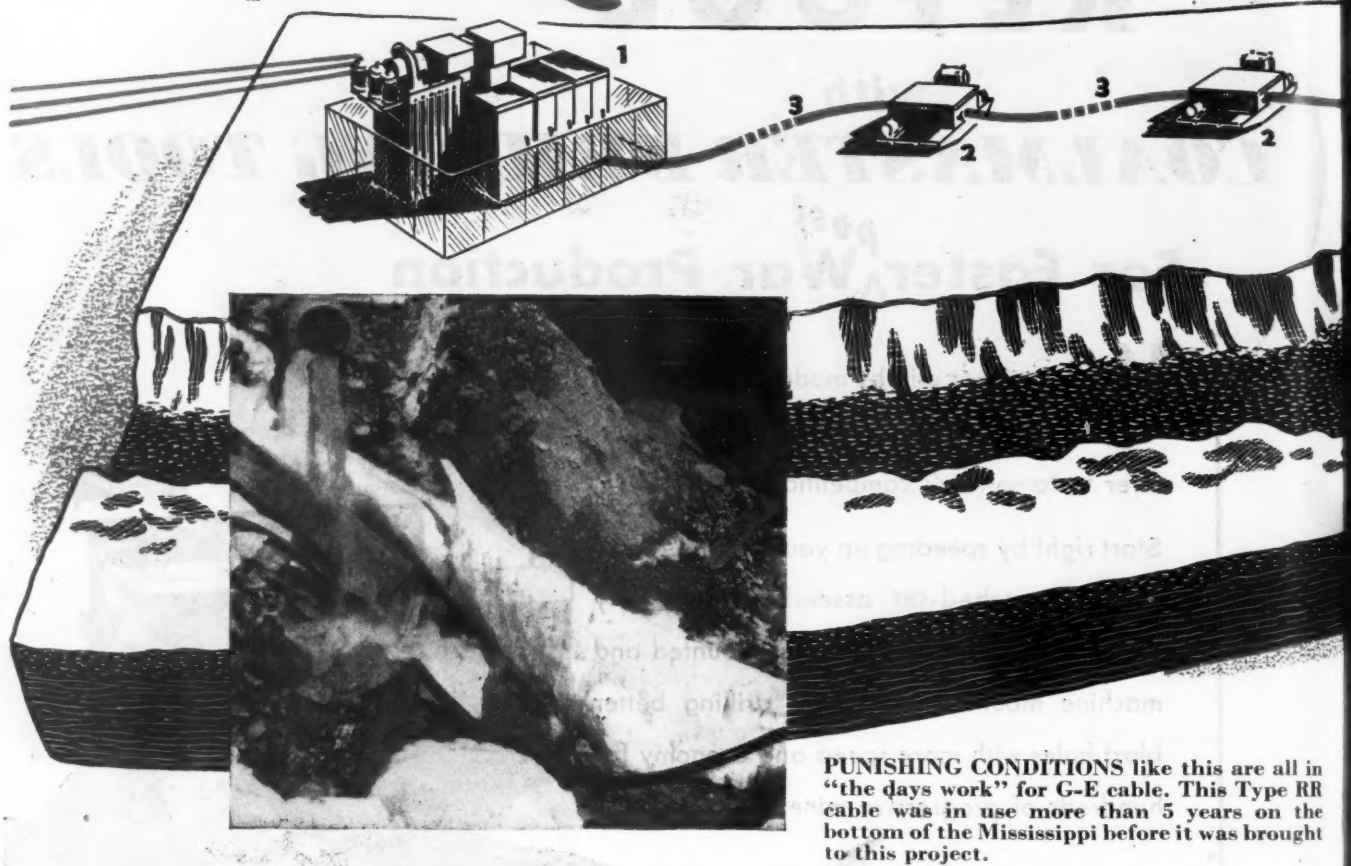
More coal per shift by modernized methods—from face to tipple—is your only answer to tomorrow's competition.

Start *right* by speeding up your drilling. Coalmaster matched-set assemblies—expertly engineered for hand held, post mounted and machine mounted drills—are drilling better blast holes with more speed and economy for hundreds of progressive mines.

CENTRAL MINE EQUIPMENT CO.

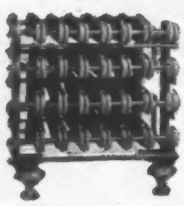
ST. LOUIS 8, MO.

You just Roll Out the



PUNISHING CONDITIONS like this are all in "the days work" for G-E cable. This Type RR cable was in use more than 5 years on the bottom of the Mississippi before it was brought to this project.

PRINCIPAL SYSTEM COMPONENTS

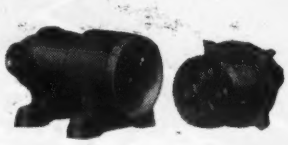


(1) THIS GROUNDING RESISTOR is designed to eliminate the hazard resulting from circuit grounds which may occur in shovels and other equipment. G-E application engineers will help you see to it that your entire system is safely grounded.

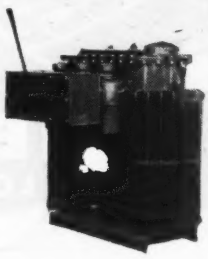
(2) DISTRIBUTION BOXES with manual oil switches are built to give the highest possible degree of portability and convenience. Lateral or trunk-line cables can be quickly connected or disconnected. (If desired, switch houses can also be supplied incorporating circuit breakers for overload and short-circuit protection.)

(3) THIS TRUNK-LINE POWER CABLE, rated 5000 volts, is ideally suited for laying on the ground. It is much lighter and more flexible than conventional leaded, armored cables. It has excellent resistance to aging, impact, and abrasion, and affords protection for personnel.

(4) PORTABLE CABLE that drags over rough terrain must be *tough.* This Type SH-D portable cable *is* tough. It is highly resistant to surface abrasion and crushing, and is difficult to kink permanently. Its flexibility makes it easy to handle—on reels or on the ground.



(5) CABLE COUPLING and uncoupling with this 2200-volt G-E cable plug is simple and quick. The coupler socket can be mounted on the shovel or the combination socket, and the plug can be used as a convenient means of connecting lengths of portable cable.



(6) COMPACT G-E PYRANOL* three-phase transformers serve dependably out-of-doors to step down voltage for operation of drills and other machines (600 volts or less). They are easily skid-mounted for rapid relocation.

*Trademark reg. U.S. Pat. Off.

POWER SYSTEM

A fully co-ordinated G-E power distribution system like this is easy to install, easy to move, and easy to extend—*and it affords a high degree of safety.*

YOU see illustrated here a power distribution system that has proved its ability to bring new speed, new flexibility, and new safety to coal-stripping operations.

In this G-E system, every component—substation, grounding resistor, cable, connection boxes, and the rest—has been carefully engineered to dovetail electrically. Because this kind of a system comes to you as a completely co-ordinated "package," you can literally roll it out and start mining. You'll find it easy, too, to extend your supply lines as operations progress farther away from the substation, or to pick up the entire system and move to a new site.

Today, G.E. is the only manufacturer that builds all the component parts—making an integrated power system that you get only when you deal with one reliable manufacturer.

Safety Features

In addition to the convenience and flexibility of placement that you get with a G.E.-engineered distribution system, you get certain definite safety features.

The cable is carefully grounded to safeguard the men who handle it (and to prolong cable life). Proper use of a well-designed grounding resistor practically eliminates the hazard of high-voltage shocks caused by touching equipment in which undetected shorts are occurring.

At the left is shown some of the G-E distribution equipment which makes this kind of power system practical and economical. G-E engineers who have applied this equipment in other strip mines stand ready to tell you just how such a system can fit your particular conditions. Call on them through the G-E office nearest you. *General Electric Company, Schenectady 5, N. Y.*

Buy all the BONDS you can—and keep all you buy

GENERAL ELECTRIC

These 6 Features Prove

GOODYEAR

Belts Are Your Best Buy

Goodyear "Coal-Flo" belts give you these outstanding advantages:

1. Proper troughing indices
2. Acid-neutralizing compounds
3. Mildew-inhibited carcass
4. Greater cover adhesion
5. Highest flex life
6. Maximum bruise resistance

No wonder Goodyear "Coal-Flo" conveyor belts hold world tonnage records in handling both bituminous and anthracite coal. No wonder they have proved their ability to carry more coal from face to tipple — to last years longer — to need less maintenance.

Every factor that means more efficient operation plus lower maintenance cost is built right into them. That's why more than 95% of all the hundreds of thousands of feet of Goodyear "Coal-Flo" belts already installed are still in use — *much of it after service of from seven to nine years or longer — an impressive record when you remember the extra pressure wartime needs have put on all conveyor belting.*

Only Goodyear conveyor belts give you *all* these advantages. Goodyear "Coal-Flo" belts are built of synthetic rubber that is specifically compounded for service in mechanized mines. For full information, call on the G.T.M. — Goodyear Technical Man — or consult your nearest distributor of Goodyear Industrial Rubber Products.

"Coal-Flo"—T.M. The Goodyear Tire & Rubber Company

FOR HOSE, BELTING, PACKING, MOLDED GOODS AND TANK LINING built to the highest quality standard in the world, phone your nearest Goodyear Industrial Rubber Products Distributor.

★ BUY WAR BONDS ★ BUY FOR KEEPS ★

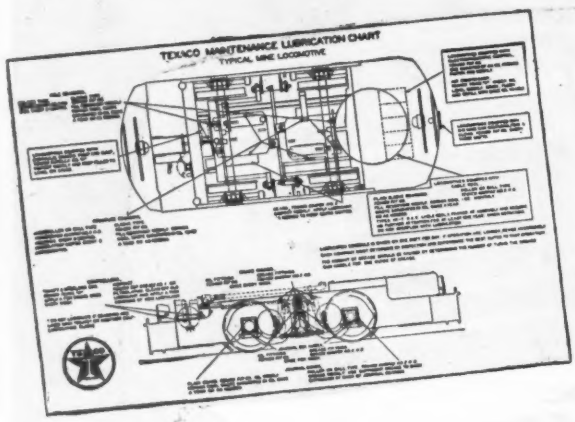
Improved Maintenance

PREVENTIVE Maintenance for preparation plant and underground mining equipment is immeasurably improved through use of the *right lubricant* in the *right amount* at the *right time* and the *right place.* Operators everywhere assure this by using Texaco lubricants.

Texaco Marfak, for example, in both anti-friction and plain bearings of shaker and vibrating screens, crushers and conveyors — as well as cutters, loaders, locomotives, etc. — provides ideal film lubrication inside the bearings, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out dirt and water. Its tough adhesive film cushions against shocks, and makes parts last longer.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

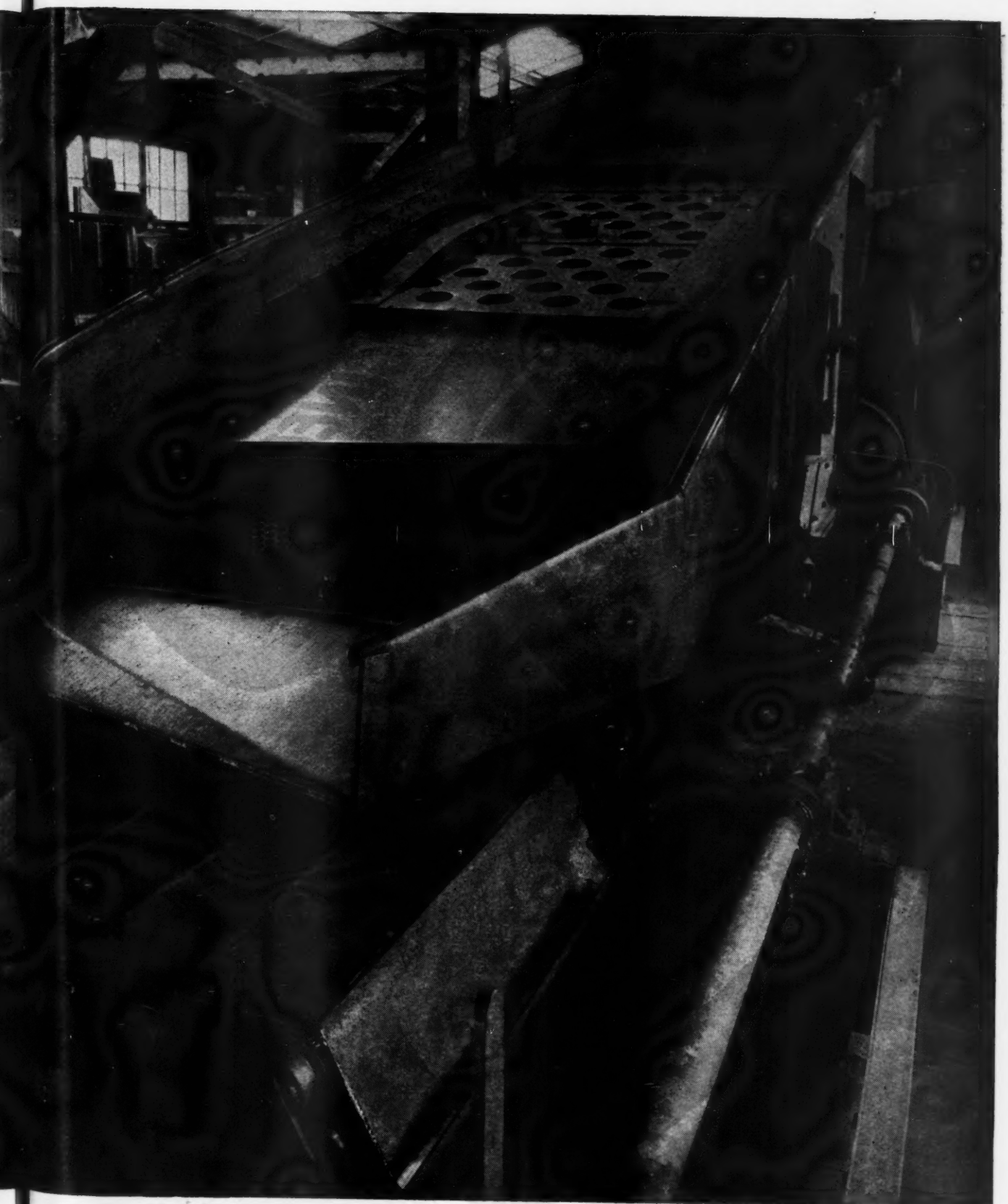
The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



FREE: Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery who approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly where and when to use the proper Texaco lubricant. Order the Charts you need by make and model of each machine.

TEXACO

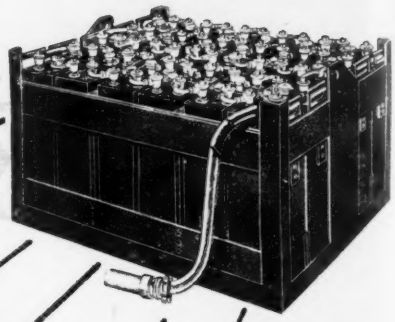
TEXACO LUBRICANTS

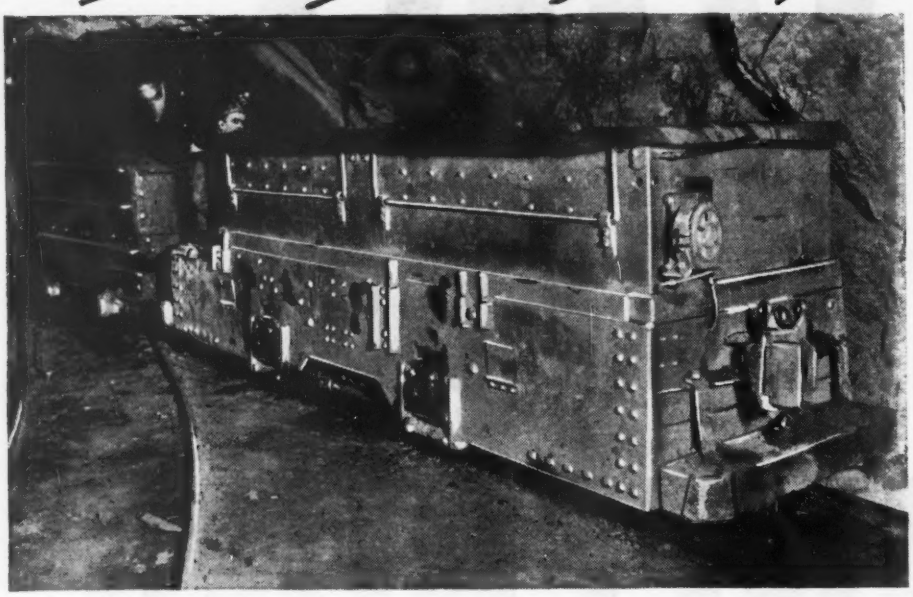


For the Coal Mining Industry

EQUIPMENT ENGINEER
MINING ENGINEER
U.S. BELTING ENGINEER

Stays on the job ...LONGER





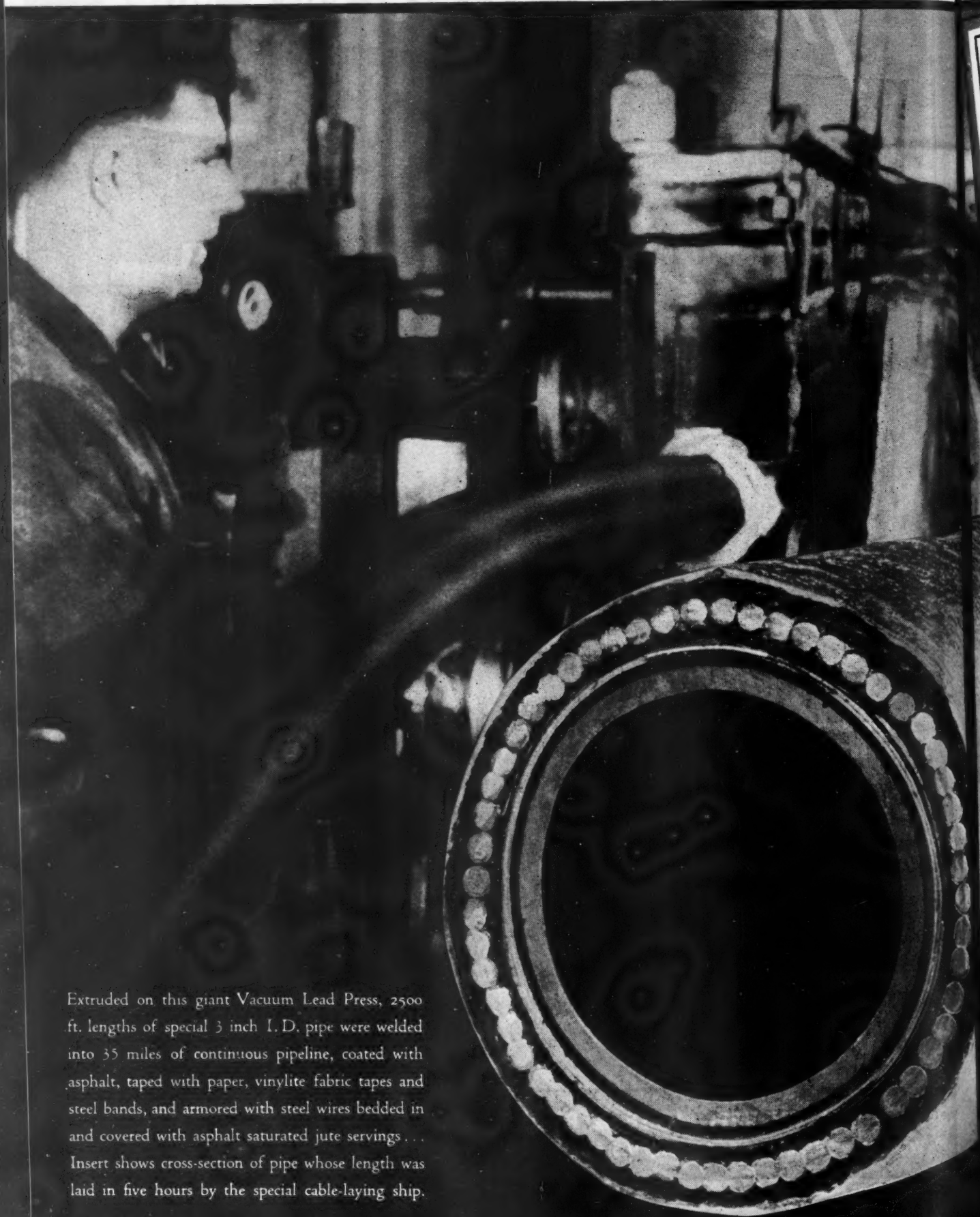
When it comes to standing up in mine haulage service — on locomotives or shuttle cars — Edison Alkaline Batteries have no equal for rugged strength and dependability. As a result, they give the closest approach to failure-free uninterrupted haulage power it is possible to obtain and give longer service life than other types of batteries. The reasons are few and simple: steel cell construction that withstands rough, hard usage; an alkaline electrolyte that is a preservative of steel; and an electrochemical principle of operation that is free from self-destructive reactions. Because they stay on the job and out of the repair shop, alkaline batteries help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J.*

Edison
ALKALINE BATTERIES

In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.
- They are **simple and easy to maintain.**

A PIPE DREAM



Extruded on this giant Vacuum Lead Press, 2500 ft. lengths of special 3 inch I. D. pipe were welded into 35 miles of continuous pipeline, coated with asphalt, taped with paper, vinylite fabric tapes and steel bands, and armored with steel wires bedded in and covered with asphalt saturated jute servings . . . Insert shows cross-section of pipe whose length was laid in five hours by the special cable-laying ship.

COME TRUE . . .

With the active interest of General Eisenhower, and Allied officers, Admiral Lord Louis Mountbatten conceived a series of pipelines under the English Channel to feed precious oil and gasoline to Allied fighting forces speeding across France, Belgium, Luxembourg and Germany.

Experience in making the largest submarine electric-power cables enabled General Cable to volunteer undertaking its part of this important contract with its own existing facilities. General Cable quickly started making this continuous 35-mile pipe, thanks to available equipment commandeered from its coast-to-coast plants, its wealth of research and engineering talent, plus dogged determination to speed Victory. In about nine months from installation, the under sea traffic fuel from England to the continent via channel pipelines had totalled 120,000,000 gallons, freeing oil tankers, cars and other transport for more vital duties. With public recording of this secret comes the buoyant feeling that dreams do come true and many more, as yet unrevealed, will foster progress in a peace we all can share.

GENERAL CABLE CORPORATION

General Cable Corporation Sales Offices are located at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City (Mo.), Los Angeles, New York, Philadelphia, Pittsburgh, Rome (N.Y.), St. Louis, San Francisco, Seattle, Washington (D. C.)

Don't Miss the Dollar for the Nickel

...a good rule to follow when selecting explosives

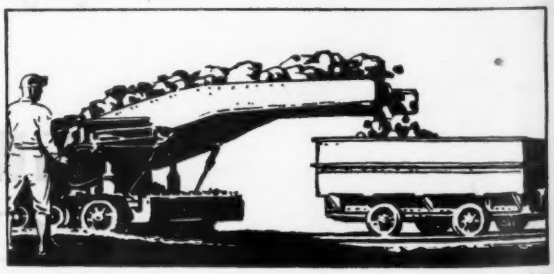
Loading and hauling—these are big items in your over-all expense. When you try to save money by economizing on blasting, you make it more difficult for these operations to *pay*.

Remember, good blasting insures quality coal. It increases production—gets more work out of your equipment, with less wear and tear. The only explosive that is really costly is the one that gives poor blasting results.

This does not necessarily mean the use of more explosives. It is the right handling of the whole blasting procedure that counts.

Of the 25 Atlas permissibles, your Atlas Representative will help you select the *right* one in the *right* amount so that you achieve economy where it really counts. It *pays* to make use of his experience!

Good Blasting Makes Money—Poor Blasting Loses Money ➧



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"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

Jeffrey 56-A Drilling machine—making two top holes simultaneously.

Jeffrey 56-A Drilling machine—drilling on bottom parallel to floor and rib.

JEFFREY *Drills*

● To meet adequately the requirements of modern drilling, Jeffrey builds a complete line of drilling equipment—each unit designed to meet a specific operating condition. These operating views illustrate the wide adaptability of our line.

Jeffrey A-6 Post Drill—making a top hole.

REY *Drills*

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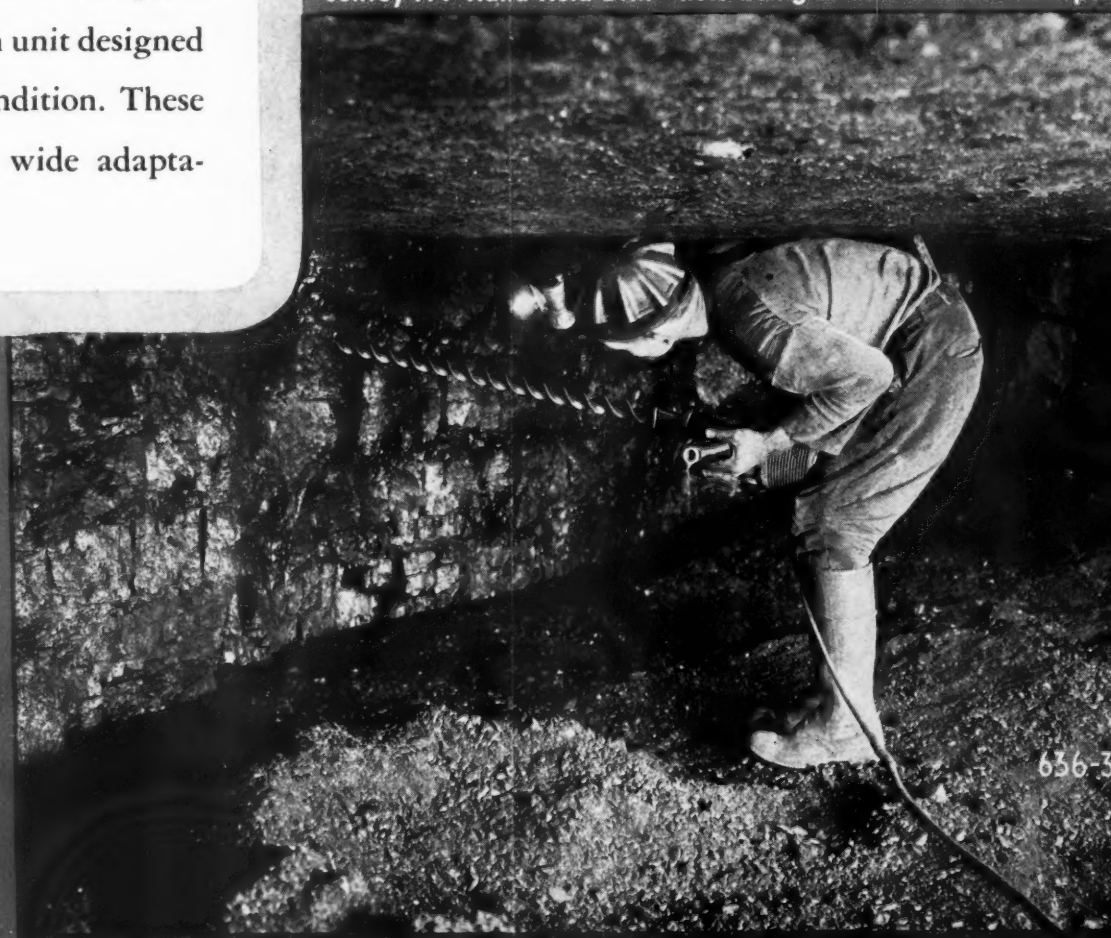
Jeffrey A-7 Hand Held Drill—hole being drilled in low-seam oper



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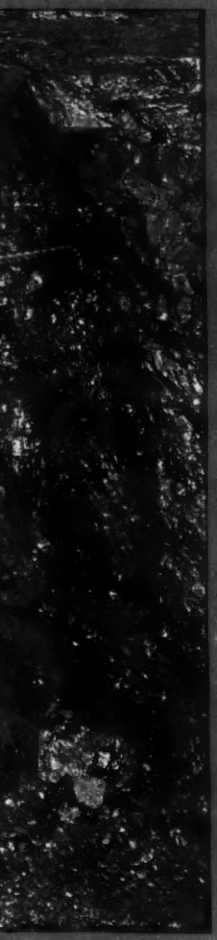

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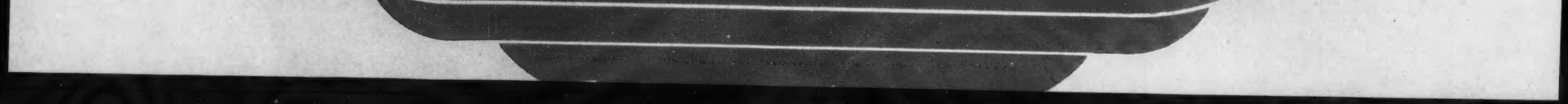
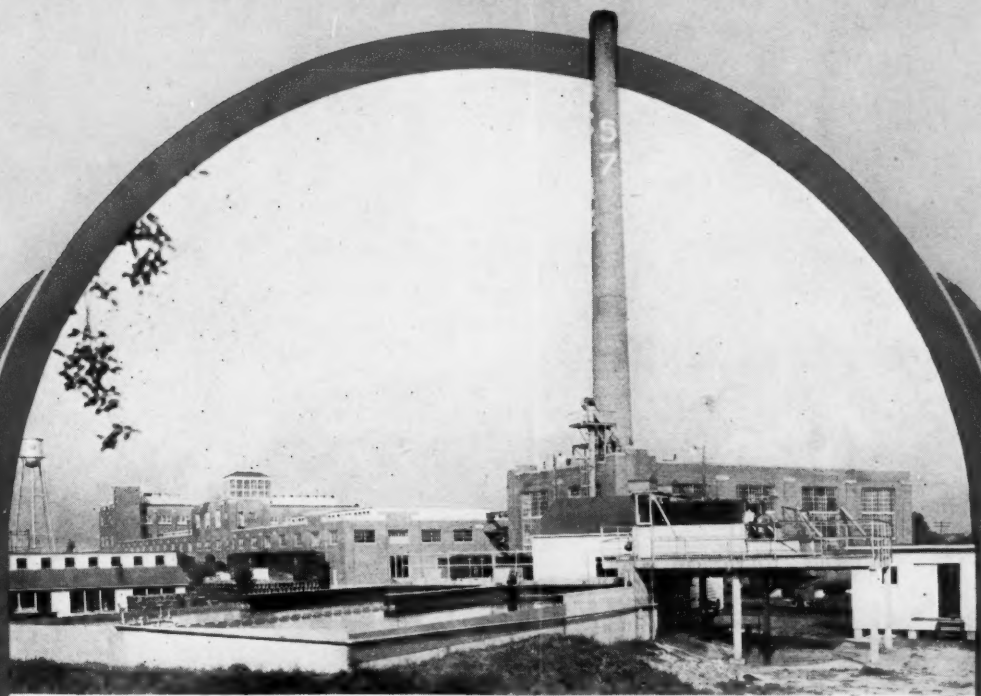




11,605,786 TONS OF COAL CONSUMED ANNUALLY BY THE FOOD PROCESSING INDUSTRIES

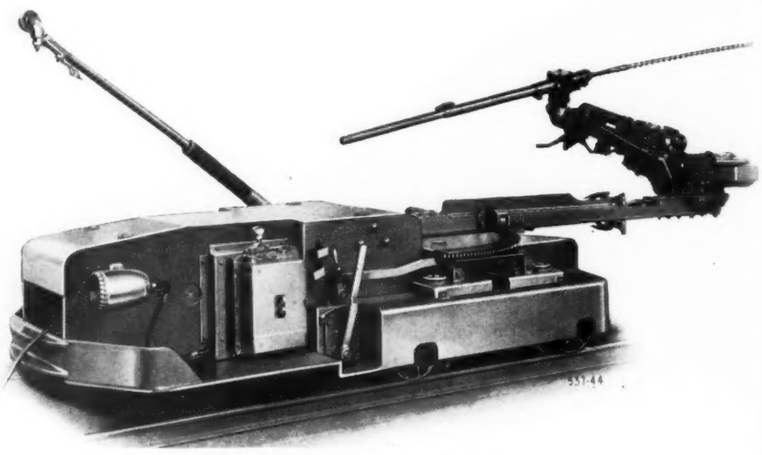
JEFFREY'S responsibility for a goodly portion of this production lies in the wide range of mine equipment—drills, cutters, loaders, locomotives, underground conveyors, fans—and a host of replacement parts used in producing this coal most economically. In addition, Jeffrey engineers will help you in the selection of the proper equipment for your specific needs—both for underground and above-ground operation.

Jeffrey DRILLS

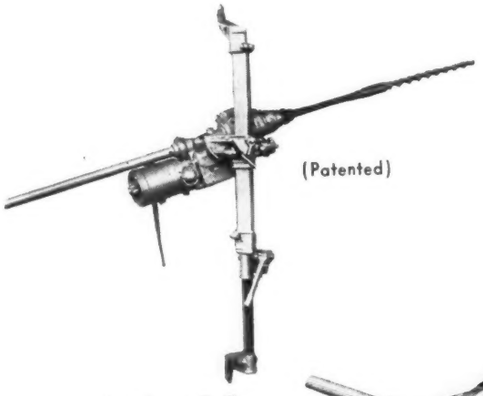
JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY

JEFFREY EQUIPMENT FOR COAL MINES

- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



56-A Drilling Machine (Patented)



(Patented)

A-6 Post Drill

(Patented)

A-7 Hand Held Drill

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake Cit
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.		Scranton
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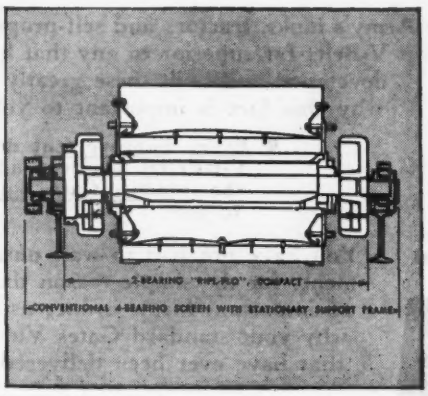
"RIPL-FLO"

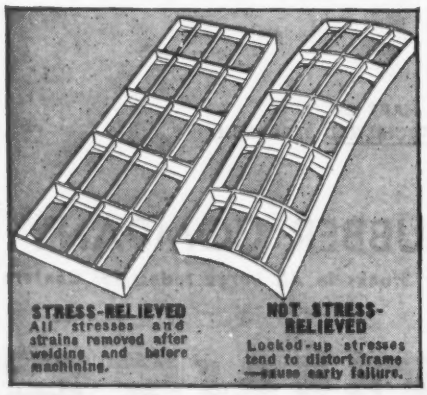
HERE'S A VIBRATING SCREEN, DESIGNED FOR ALL GENERAL APPLICATIONS, THAT'S LOW IN FIRST COST AND MAINTENANCE!

1 2-bearing "Ripl-Flo" *costs less* than any comparable 4-bearing screen, yet it's warranted to do equal or better screening job! Hundreds of these *modern* screens are in use today all over U.S.!



2 Here's one reason A-C can build "Ripl-Flo" for less money, pass savings on to you: Unnecessary outer bearings and stationary support frame are eliminated—reducing width 17%, weight 36%!

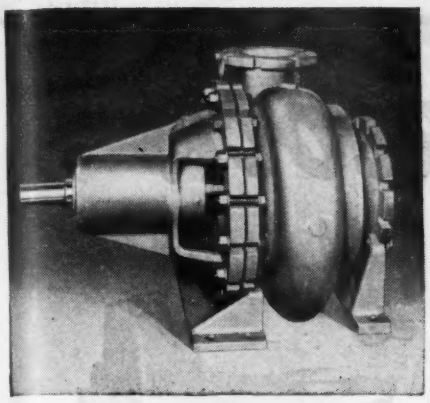
3 Balanced mechanism imparts a *perfect circle throw* to every point on screen surface. Result: uniform travel of material; rapid stratification; full capacity; and smooth performance all the way!



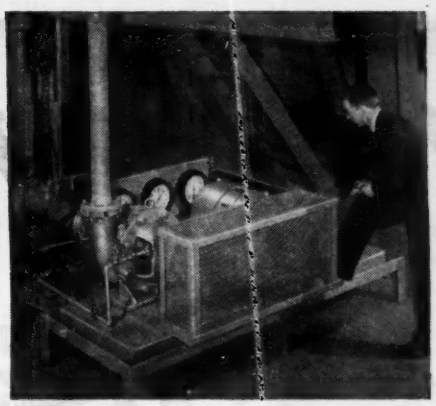
4 Want low maintenance, longer equipment life? All welded parts on "Ripl-Flo" are stress-relieved —eliminating failure adjacent to welds, making entire structure uniformly strong.

5 Every "Ripl-Flo" screen is shop-tested before it can go out to do a job for you. Operating in a special test rig, it is thoroughly checked for throw, balance, bearing temperatures, etc.

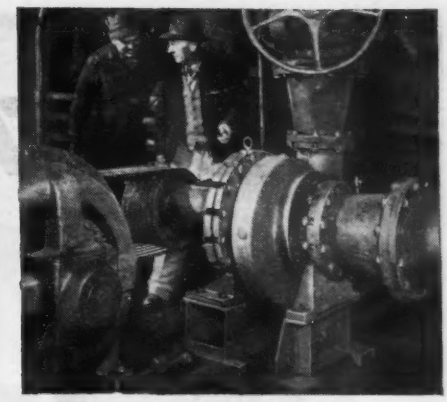
6 Call or write for new "Ripl-Flo" bulletin B6151B today. Contains quick facts as well as detailed specifications about most modern, low-cost screen in U. S.—how it's built, how it operates, etc.



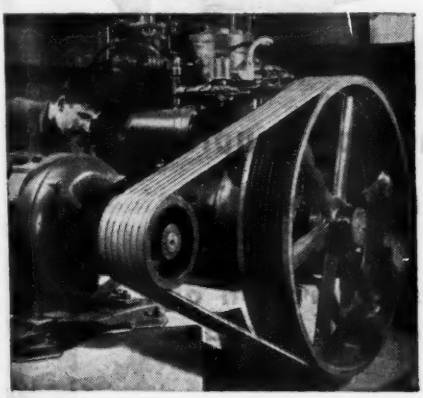
7 Another A-C product that helps lower coal preparation costs is the new Solids-Handling Pump. It is designed for coal-handling, water recirculation and sludge disposal in preparation plants.



8 Combining a *special* design plus a *new*, highly abrasive-resistant alloy, it *outlasts ordinary pumps 2 to 4 times* . . . promises a *lower cost* per ton handled than conventional units of this type.

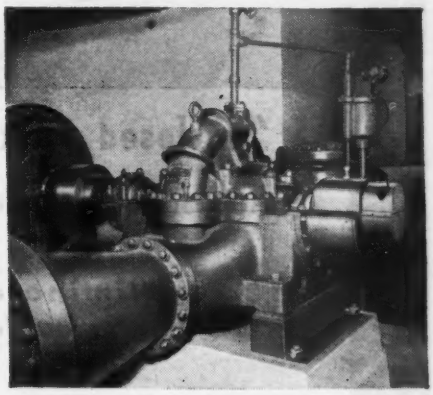


9 Mid-west coal plant uses this 10" x8", 3000 gpm, 70 ft head unit to pump return jig water, 17 to 20% solids, to settling cone. 8 sizes now developed to handle through 7000 gpm. Send for B6381.



10 A-C not only builds basic processing machinery, but motors, controls, Texrope drives needed to run it. That means unit-responsibility—no "buck-passing"!

11 Planning ahead for more efficient power distribution in your plant? This scale model "Unit Substation Builder Set" can help you plan *visually*—saves time!



12 This 2-stage Mine Dewatering Pump, rated 9000 gpm, 360 ft head is typical of A-C pumps for coal. Others in capacities from 10 to 150,000 gpm, heads to 2500 lbs.

ENGINEERING COOPERATION — ANOTHER GREAT A-C PLUS!

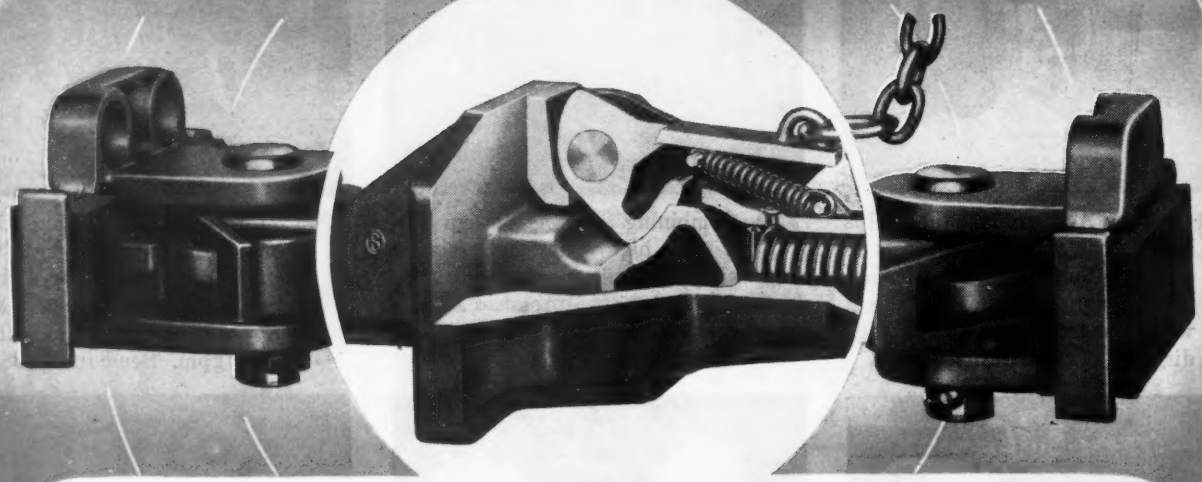
☛ ***Cooperative engineering:*** **A-C engineers, working with your own staff or consultants, help select machinery for your mine, tipple, preparation plant or dock on basis of how it will fit your *entire* process. They look for ways to make *existing* as well as new equipment "team-up" for greater production.** ☛ ***Unbiased Recommendation:*** **A-C builds many types of equipment for coal. When you need screens, for example, you select from *4 different types*, get *exact* equipment you want!** ☛ ***Emergency Parts Service*** **— expediting on urgent repairs. In most cases, parts are shipped right from stock.**

A 1890-B

ALLIS CHALMERS

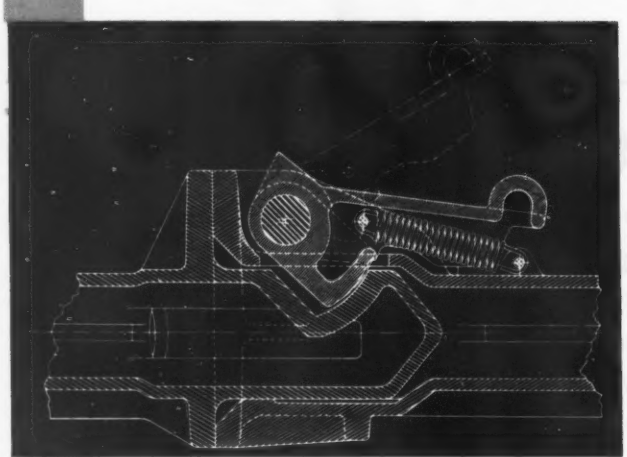
MILWAUKEE 1, WIS.

POSITIVE INTERLOCK



"Enclosed Pocket" of O-B Automatic Mine Car Coupler Keeps Coupler Heads in Full Engagement Under All Conditions

- ***Eliminates Vertical Intercoupler Movement***
- ***Permits Operation on All Normal Grades***
- ***Allows Full Pulling or Pushing Capacity***
- ***Prevents Disengagement in Case of Derailment***



There's no chance of intercoupler movement or accidental disengagement with O-B's male-and-female type coupler heads. Movable cam on female head fits snugly into corresponding notch in male head, holding it securely within enclosed pocket. Bearing faces of cam and notch are identical arcs, concentric with respect to each other but excentric with respect to center of cam pin. This forces cam to pull into the notch. The more tension between coupler heads, the more tightly cam presses into notch, insuring positive interlock. A small spring is provided to snap cam into notch quickly upon engagement.

INSTALL O-B AUTOMATIC MINE CAR COUPLERS

The Couplers Designed Specifically To Meet Mine Operating Conditions

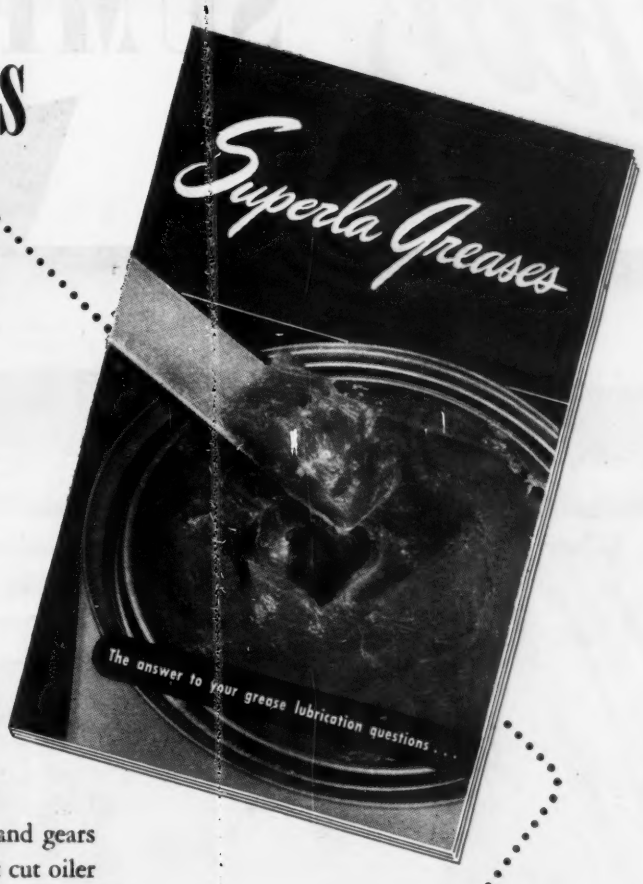
2564 AM

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS COMPANY, LIMITED, NIAGARA FALLS, ONTARIO

What qualities to look for in cost-saving greases



QUALITIES that reduce wear on bearings and gears . . . that stop excessive consumption . . . that cut oiler time for servicing equipment . . . these are the qualities you want in a grease. What they are and how you can get them is described in a booklet illustrated at right.

Many of the advantages, which you would expect to find only in special purpose, premium priced greases, are available in a line of 11 grades—including high-temperature greases—called

SUPERLA GREASES

Send for this Booklet

It tells how the most desirable qualities have been incorporated in a complete line of grease to reduce costs on a wide range of Industrial application.

It also has hints on hand packing anti-friction bearings and avoiding over-lubrication.

You can get a copy from the Standard Oil Industrial Service Representative who calls on you or by writing Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

JOB IN COAL MINE

1-Keeps Haulage Way Dry
2-Furnishes Water For Spraying

In this busy Pennsylvania coal mine seepage water is dammed by a sluice board. 10 feet behind the board a Thor Pneumatic Sump Pump is set up. As water gathers it is pumped 180 feet through a bore hole and lifted 27 ft. to a large tank. A second Thor Sump Pump in this tank forces the water to a spraying system which sprays all the coal mined from 12 chambers before it is loaded.

Doing this double job efficiently, Thor Sump Pumps are effecting substantial savings in operating costs. Air-powered, they cannot cause explosions . . . light and compact, they are easily moved to any location. In addition, special Thor features of positive, continuous lubrication and automatic speed control keeps these pumps on the job day after day with a minimum of attention and maintenance.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Blvd., Chicago 6, Illinois
New York, Philadelphia, Pittsburgh, Salt Lake City, Los Angeles

Thor MINING TOOLS
Auger Rock Drills
Sinker Rock Drills
Drifter Rock Drills
Stoper Rock Drills
Hitch Cutters
Portable Saws
Sump Pumps

Self-priming, Thor Sump Pumps operate efficiently in dirty water, oil, sludge or sewage either partially or fully submerged. Feature by feature they are made to handle the toughest jobs. Get full facts from Thor Catalog No. 42A. Write for your copy today.

Thor PORTABLE POWER TOOLS

PNEUMATIC
UNIVERSAL ELECTRIC
HIGH FREQUENCY ELECTRIC

Underground Stuff

U·S·S AMERCLAD PORTABLE POWER CABLES

are engineered for Mining Service

IF PORTABLE power cord and cable performance is a problem at your mine, you may find the answer by switching to U·S·S AMERCLAD.

AMERCLAD Portable Power Cords and Cables are designed and constructed to stand up under the severest abuse . . . down where atmospheric, ground and mechanical conditions are at their worst. Repeated reeling, exposure to grease, water and acids, and contact with sharp rocks and other abrasive surfaces have little affect on AMERCLAD. AMERCLAD'S flexible, tough rubber-armor withstands the roughest handling . . . insures the uninterrupted flow of power to electric locomotives and mining machines.

In AMERCLAD, American Steel & Wire Company engineers have combined physical and chemical properties to the best advantage. New synthetic rubber compounds have been developed which, in many cases, offer properties superior to natural rubber.

AMERCLAD Low-Voltage Cables are flexible to permit continual reeling and unreeling, yet are sufficiently tough and rugged to withstand the roughest sort of usage. They operate satisfactorily under heavy overloads and attendant high temperatures. Their resistance to water, oil and acids contributes to their long life.

AMERCLAD High-Voltage Cables provide high impulse strength plus flexibility without danger of corona cutting so that when operated with suitable line protection they insure continuity of service and freedom from breakdown.

Write for our booklet, "Amerclad Cords and Cables." You'll find it helpful in solving your power cable problems. Contains construction details and specifications.

American Steel & Wire Company

For Anthracite Service: Miners Bank Building, Wilkes-Barre, Pa.

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

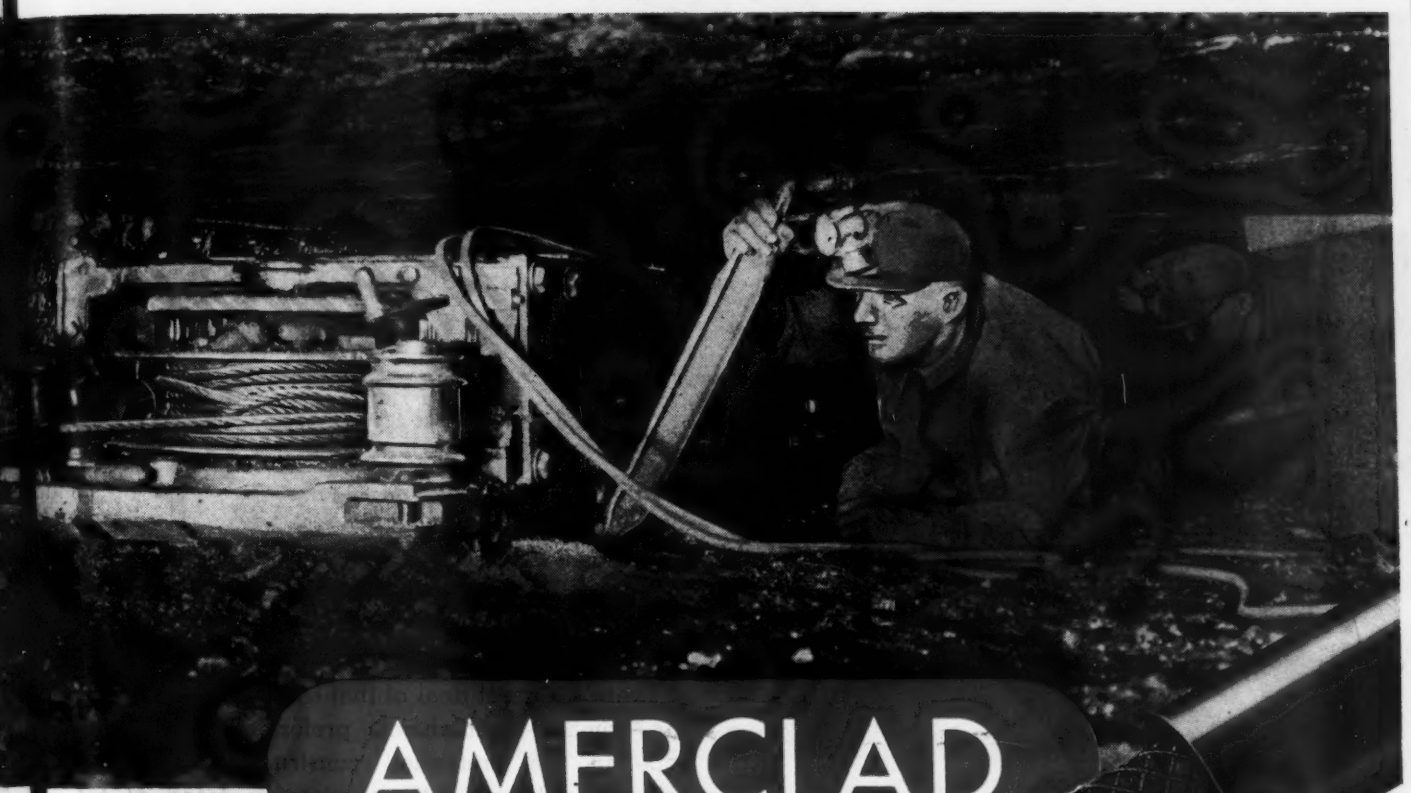
United States Steel Export Company, New York

UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY · USS STEEL · UNITED STATES STEEL

U·S·S AMERCLAD

and Plenty Tough!



AMERCLAD

U·S·S AMERCLAD Single-Conductor Locomotive Gathering Cables. Specially designed for electric mine locomotives of the gathering-reel type, but suitable for any purpose that requires a flexible single-conductor portable cable to withstand hard usage, acid, water, and operation at high temperatures.

U·S·S AMERCLAD Twin Parallel Mining Cables. Lighter in weight than two-conductor round cables of the twisted type, and occupying less space on a reel or drum. Many users prefer them as they are easy to splice and the heavier insulation between conductors affords greater protection against heavy impact or crushing weight.

U·S·S AMERCLAD Three-Conductor Mining Cables. PS Shielded. For high-voltage operations, these cables offer definite advantages: (1) Heavier walls of insulation and heavier outer jacket. (2) Positive clearing of cables in case of "short" or cable injury. (3) Safety to workmen who may handle the cable or accidentally penetrate it with tools. (4) Elimination of "static cutting."

Other U·S·S American Electrical Products for mine use:

Tigerweld Rail Bonds · PS (Conducting Rubber) Shielded Cable

Bore Hole Cable · Amerclad Shovel Cable

Ampyrol Resin-insulated Cable

POWER CABLES

LIKE A CHAMPION DIVER...

FORM-SET ROPE IS *Relaxed*

In suppleness, rhythm, and grace, few sports performers can equal the well-trained diver. But this perfection is more than a matter of practice. Championship form means *relaxation.*

There's a great deal of that same relaxed quality in Form-Set—Bethlehem's preformed rope. Wire rope in the preformed construction has been relieved of many internal stresses; freed of the locked-in tension that sometimes shortens rope life.

The helical wires don't have a nervous urge to straighten themselves out. Cut a section of Form-Set rope and see what happens. *Nothing.* The wires and strands lie just as they were. They don't pop loose or "wicker."

As soon as you start rigging Form-Set, you'll notice this *relaxed* quality. Form-Set handles like a kitten—it's tractable, easy to work with. On many applications it lasts longer, too—especially where bending fatigue is a serious factor. Since it's relaxed, Form-Set bends more easily over sheaves and drums.

All grades, sizes, and types of Bethlehem rope can be obtained with the Form-Set construction. Get the full story from our nearest office or distributor.

Why a Form-Set rope is relaxed. Preforming "sets" the wires and strands in their permanent helical shape, so that they have no tendency to fly apart . . . even when cut or broken.

When you think WIRE ROPE . . . think BETHLEHEM

The Key to successful Strip Mining is Selection of the Correct Explosives

In either Anthracite or Bituminous stripping, selection of the correct explosive for removal and distribution of the overburden is of prime importance. This is also true in the blasting of the uncovered coal.

AMERICAN explosives and blasting accessories are products of intensive research, chemical control, thorough inspection and unremitting care in manufacture; they include a grade suited to your problem.

- ★ **HIGH EXPLOSIVES**
- ★ **PERMISSIBLES**
- ★ **BLASTING POWDER**
- ★ **BLASTING ACCESSORIES**

• *Capable field engineers are available at your call.*

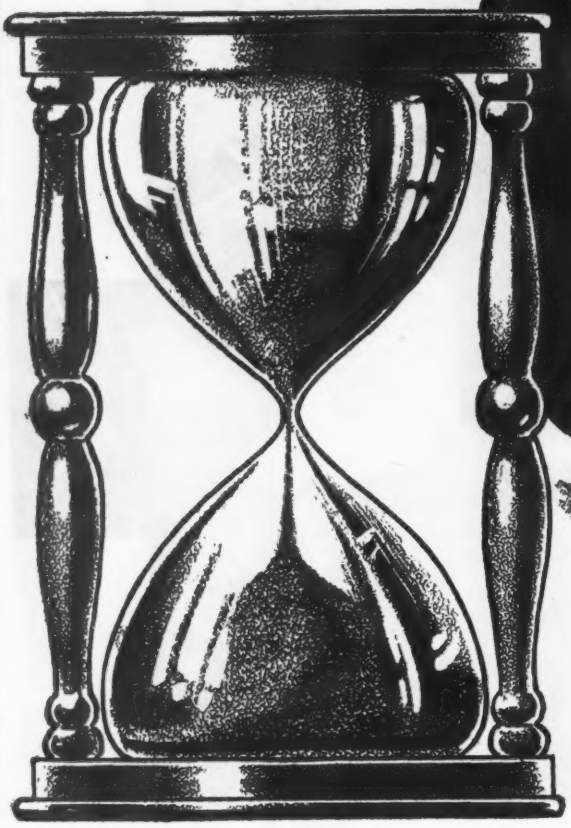
American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK. N. Y.

EXPLOSIVES DEPARTMENT

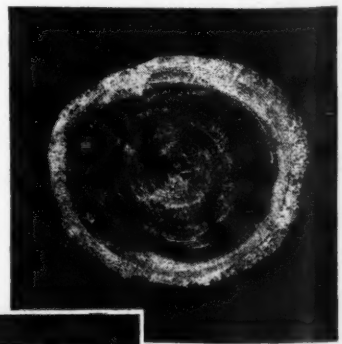
SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.



OSMOSALTS IS A *Time-Proven Product*

The economies of treated mine timbers have been proven over and over again. So too—and just as definitely—have the advantages of OSMOSALT treatment been proven. The fact that timbers treated with Osmosalts are left with a clean, paintable, easily handled surface also scores heavily for this proven product. Better than Two Hundred mines have satisfied themselves by actual use—that's the best proof we know of for any product.

For those companies who prefer to purchase treated timbers, facilities are now available for the treating of ties and timbers with Osmosalts, or, we can supply you with the Osmosalts for your own treatment of your own green timbers. No waiting for seasoning, no expensive equipment, no skilled labor required. Write for literature and cost data.



The white outer area of this timber cross-section, shows the deep penetrating action of the toxic chemicals in Osmosalts.

OSMOSALTS

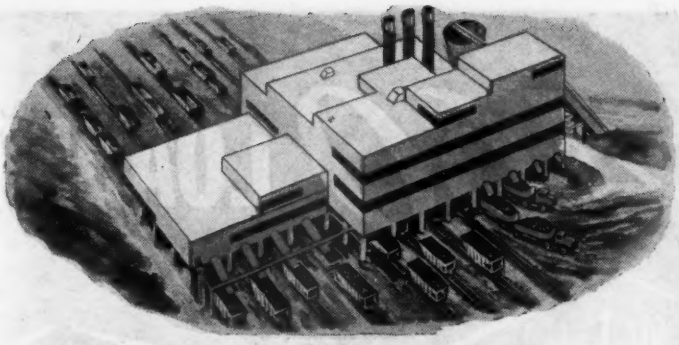
Nature's Method of Wood Preservation

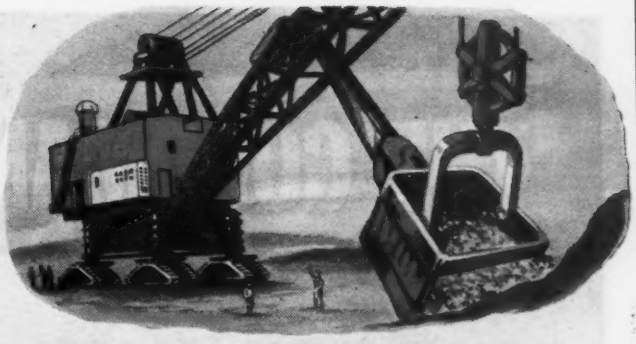
Composition and Process Patented and Patents Pending

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

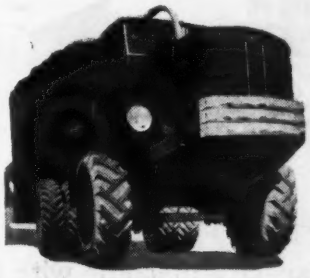
BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; BECKLEY, W. VA.; HARLAN, KY.





PLANTS GETTING BIGGER... **DIPPERS GETTING BIGGER...**

How about your trucks?



By themselves, bigger plants and shovels can't raise tonnage. They've got to be geared together with high—tonnage trucks. That means Walter Tractor Trucks because they combine 60 ton payload capacity with the speed and maneuverability that maintains high tonnage records.

The reason why Walter Tractor Trucks can haul 60 ton payloads through soft pits and up steep grades is that the 300 H.P. motor's torque is efficiently converted into traction by the Walter Four Point Positive Drive. Three automatic locking differentials proportion the power to the FOUR driving wheels according to the traction of each wheel at any instant. Thus, wheel slipping and its consequence, road gouging and tire grinding are prevented.

The Walter Tractor Trucks' high maneuverability results from hydraulic steering, plus short wheelbase and correctly distributed weight provided by the engine-ahead-of-wheels design. This not only saves time but it also reduces driver fatigue. Other features such as the tractor type transmission and suspended double reduction drive are described in folder. Write for it.

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

HAUL

60 TON PAYLOADS

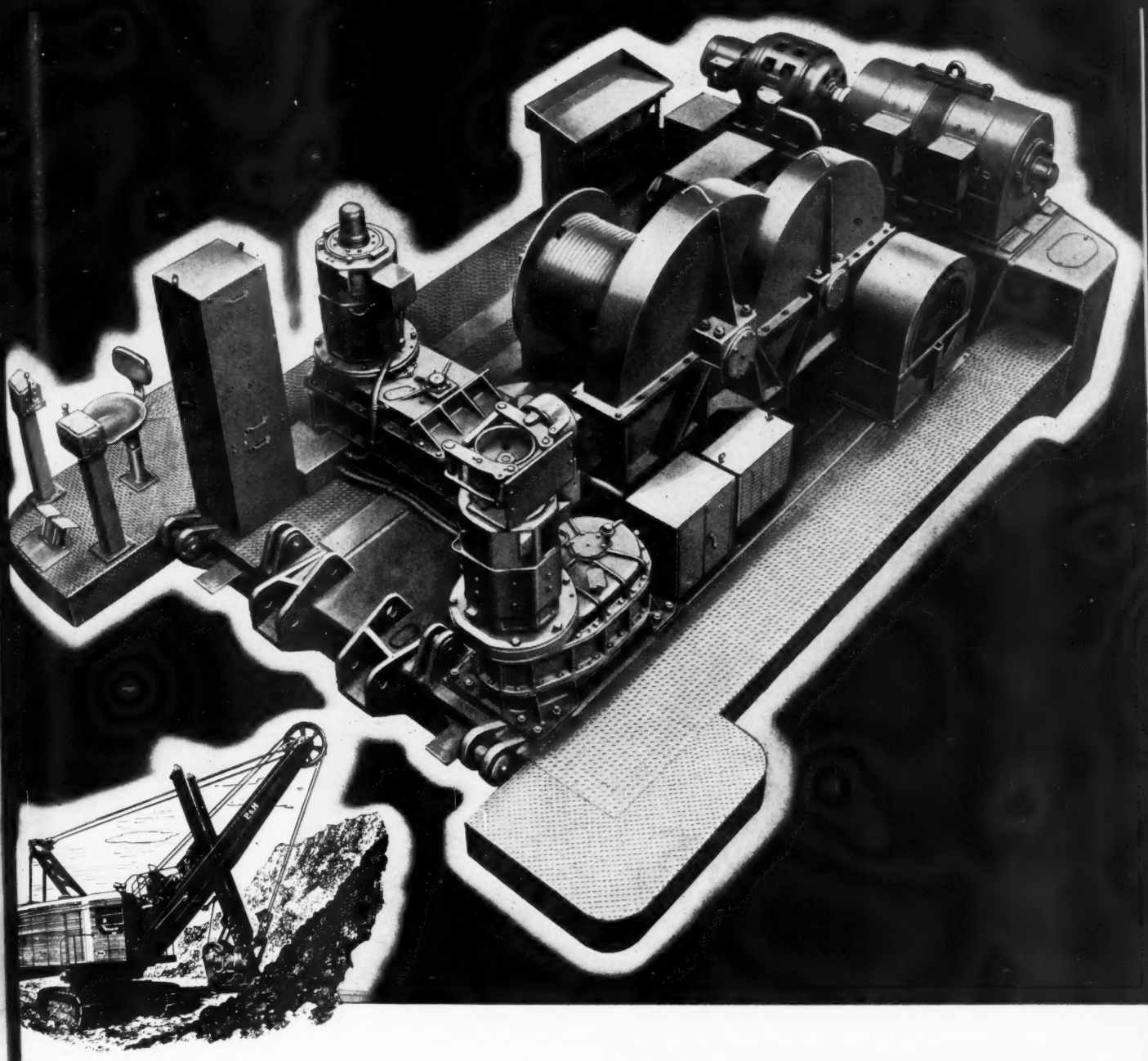
WITH

WALTER

TRACTOR TRUCKS

TE AND DIGS OUT TIGHT SHOTS

NG COMPANY • Halsted Street at 48th • Chicago 9, Illinois



Giving Kilowatts a New Incentive

• This is the machinery deck of the new P&H Electric Shovel—the simplest, most efficient, most modern arrangement yet devised.

But this is only an outward indication of one of its most vital qualities — *higher electrical efficiency.* This is no assembly of electrical equipment gathered from the open market. All electrical units are *designed* and built by P&H for one specific purpose — dependable digging. And each unit is built to meet its service requirements *exactly.*

Simplification has eliminated the need for contactors and contactor control cabinets — electric wiring has been reduced more than 40%. And, since all equipment on the machinery deck remains in place during shipment, there is no opportunity to "botch up" wiring or circuit connections.

This finer electrical system is the result of P&H's sixty-year leadership in applying electrical power to the movement of heavy loads. Bulletin X-83 describes it.

P&H

ELECTRIC SHOVELS

4540 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

Coal RECOGNIZES ITS RESPONSIBILITIES TO INDUSTRY AND THE HOME

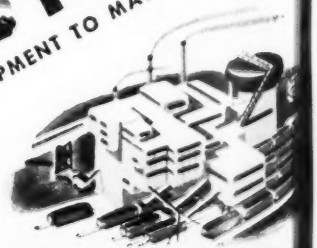
Coal recognizes its future responsibilities and accepts them—just as it met and accepted responsibilities during the war. Then, in the face of manpower shortages and many handicaps, management and men saw to it that every essential industry and the home received the fuel-lifeblood of their operations.

The future offers enlarged opportunities to serve mankind with better fuel—fuel with higher heat value and lower ash content. Manufacturers of steel, automobiles, airplanes, the utilities, and the railroads will receive coal developed for their specific needs . . . metallurgical coal, solid coal, pulverized coal, fluid coal. Coal for the home will have an undreamed of cleanliness . . . a versatile fuel to produce cozy warmth in winter or cool comfort in summer.

Coal preparation plants of the future, as McNally Pittsburg builds them, will capture increasingly high percentages of combustible fuel and enable coal operators to meet exacting grade specifications.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTE



McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Ill. • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Bra

The First Step

IS CAREFUL PLANNING TO PRODUCE PREMIUM FUEL

First steps in turning raw coal into premium fuel need not be taken alone. Our experienced engineering and technical staff is ready to assist you in developing the plans for your completely equipped preparation plant, just as they are assisting other operators wherever bituminous coal is mined.

Each plant is built to meet the specific needs, with designs as simple or extensive as your raw coal and your markets demand. From blueprint to finished structure is but a series of progressive steps under centralized control. Every unit of the plant, the fabricated housing-structure, the screens, washing and drying units, and other machinery are made in McNally Pittsburg shops by skilled artisans; assembled and erected on the site by experienced crews.

Completed . . . the plant is fully equipped to groom coal into clean, low ash fuel, for which there is a ready and steady market . . . and the cost of such preparation is but a few cents per ton.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Ill. • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil

FROM SHOVEL TO RAILROAD

SIX INTERNATIONAL KR-11's are doing a job for J. R. Cowden, hauling contractor of Hickory, Pa., along with eleven earlier model Internationals.

These rugged trucks, powered by the famous International Red Diamond 450 Engine, provide a low cost, flexible means of hauling direct from the shovel over rough, make-shift roads, to breaker, cleaning plant or railroad.

The haul is five miles from the strip mine of the William Aloe Coal Company to the loading platform shown above, with each truck making fifteen round trips a day.

The efficient performance of these KR-11's, like all Internationals, results from the way they are designed, built and tested—so expertly that in the ten years before the war more Internationals were sold than any other make.

But something more contributes to their efficiency. They have ample capacity and power for the work to be done—capacity and power that provide ton-mile economy, and long, trouble-free service.

Take advantage of that recommendation—*ample truck capacity and power*—and the proved performance of International Trucks.

HARVESTER

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

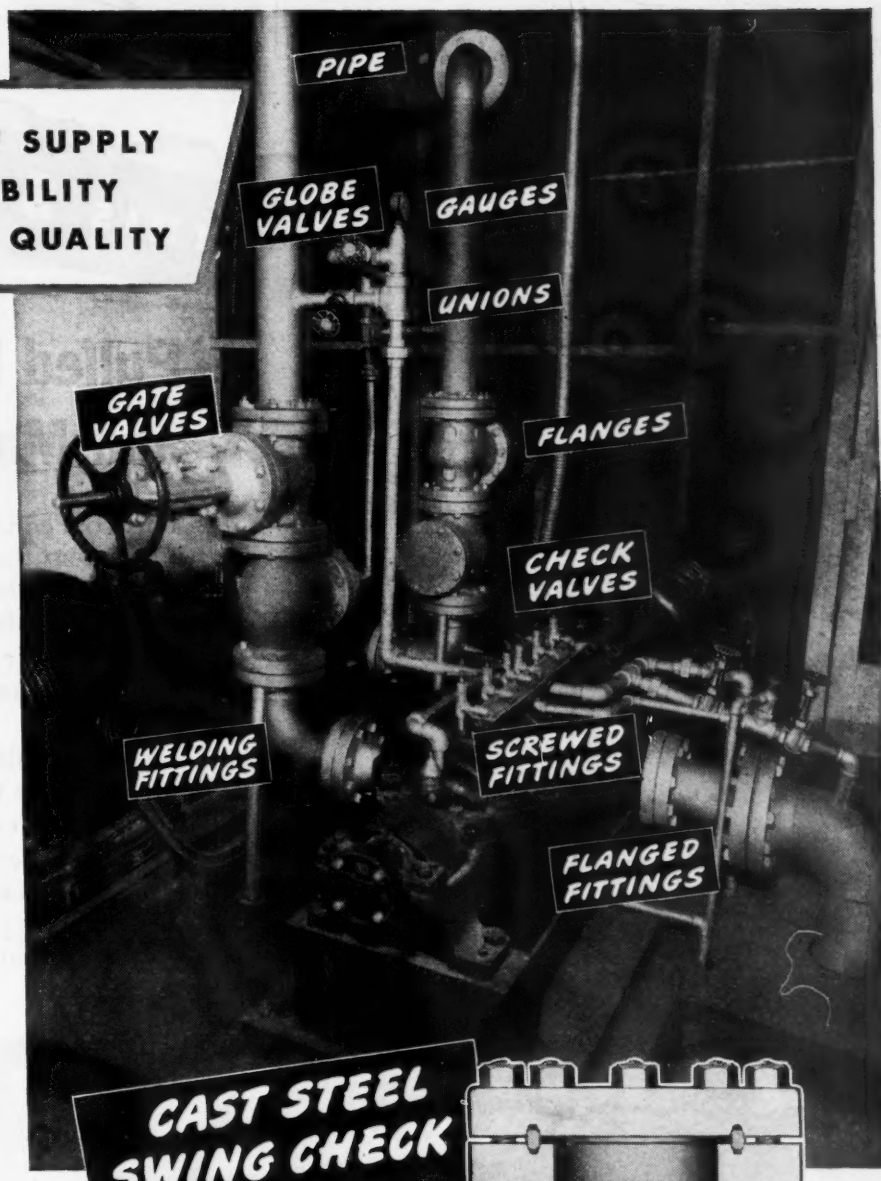
NEW TRUCKS: The government has authorized the manufacture of a limited quantity of light, medium and heavy-duty International trucks for essential civilian hauling.

SERVICE: Many operators will have to wait for trucks. Maintenance of existing vehicles is just as important today as before VE Day. Therefore—be sure your trucks get top maintenance and service at International Truck Dealers and Branches.

INTERNATIONAL *Trucks*

Whatever Piping Materials You Need
MAKE THEM CRANE

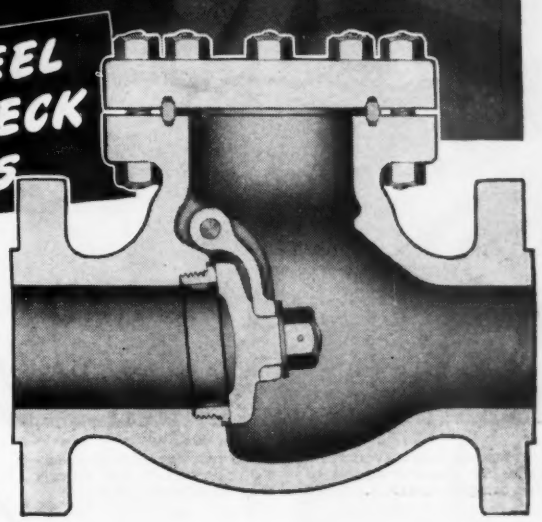
ONE SOURCE OF SUPPLY
ONE RESPONSIBILITY
ONE STANDARD OF QUALITY



Consider how using Crane *complete* piping material service simplifies deferred replacement work . . . and helps keep piping at peak efficiency. One source—your Crane Branch or Wholesaler—supplies all your requirements, in brass, iron and steel. One high standard of quality in all materials—and one responsibility behind them—help assure the best installations. And you get full benefit of Crane Co.'s 90-year experience in piping equipment manufacturing. Below is one example of a Crane solution to many of your check valve requirements.

Piping to underground seepage pump.

CAST STEEL SWING CHECK VALVES



SERVICE RECOMMENDATIONS: *Crane Cast Steel Swing Check Valves* with Exelloy to Exelloy seating materials are recommended for a wide variety of mining services—steam, water, air, gas or oil lines—for all working pressures up to 2500 pounds steam, and 6000 pounds cold. Available with screwed, flanged or welding ends in all practical sizes. See your Crane Catalog for full specifications.

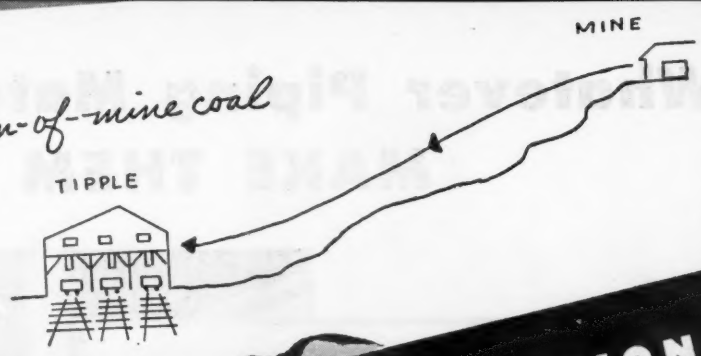
CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE

90 YEARS OF PROGRESS 1855 1945

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

The Problem—
To lower huge tonnages of run-of-mine coal
down 1500 foot hill
from mine opening
to tipple



THIS S-A SOLUTION

Pulled Down Handling and Maintenance Costs

This coal company needed not only a conveying system that would handle coal fast and efficiently at low cost, but one that would *keep operating* with a minimum of maintenance.

The answer developed by S-A Engineers is the highly successful 1500 foot Belt Conveyor shown here.

Since installation over 11 years ago, it has moved more than 6 million tons of coal at low per ton costs and with little attention.

S-A Conveyors all over the world have earned service records like these . . . reason enough why you, too, can be assured of *low cost per ton* handling with S-A equipment.

This retarding belt travels at rate of 300 feet per minute, *generating* 50 *horsepower* as a result of its slope down hill. Belt travels on S-A Simplex Carriers, equipped with Timken bearings.

A gravity take-up at the base of the downhill run regulates belt tension. On the run from the point where belt receives coal to the tipple, it drops a net decline in elevation of 264 feet.

STEPHEN S-A ADAMSON MFG. CO.

2 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT

When coal is dislodged by the powerful—but non-shattering-action of expanding carbon dioxide from a CARDOX tube, every piece of mechanized equipment used pays extra dividends.

For example, longer cutter bars may be used. This provides more coal per face, reducing the time lost in moving the loading machine.

Loading is faster... and the loading machine is subjected to less wear... because the slow heaving action of CARDOX rolls the coal forward in a loose pile.

Non-productive time per shift is greatly reduced. Since CARDOX produces no noxious fumes, and very little dust, work can be resumed immediately after the face has been dislodged.

CARDOX
HARDSOCG DRILLING EQUIPMENT
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

CARDOX also reduces many mining hazards, including roof failures, overhanging brows in high seams and fire.

Write for full list of mine-proved CARDOX benefits, and details on free demonstration.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

SIGN OF DEPENDABLE TRANSPORTATION

● Where you see the Ward LaFrance Dealer Symbol displayed, you'll find an alert merchant with something new and better in rugged, low-cost transportation to sell . . . The new Ward LaFrance commercial truck models are built BIG all the way through . . . with payload capacity running up to thirty tons . . . big wherever extra size, extra strength, or extra power can add to dependability of service, or hauling economy.

In Ward LaFrance heavy-duty trucks, you will discover an entirely new standard of reliability and performance. Prove it to yourself by visiting your Ward LaFrance dealer. If there is no dealer in your locality, write our Sales Department for interesting details.

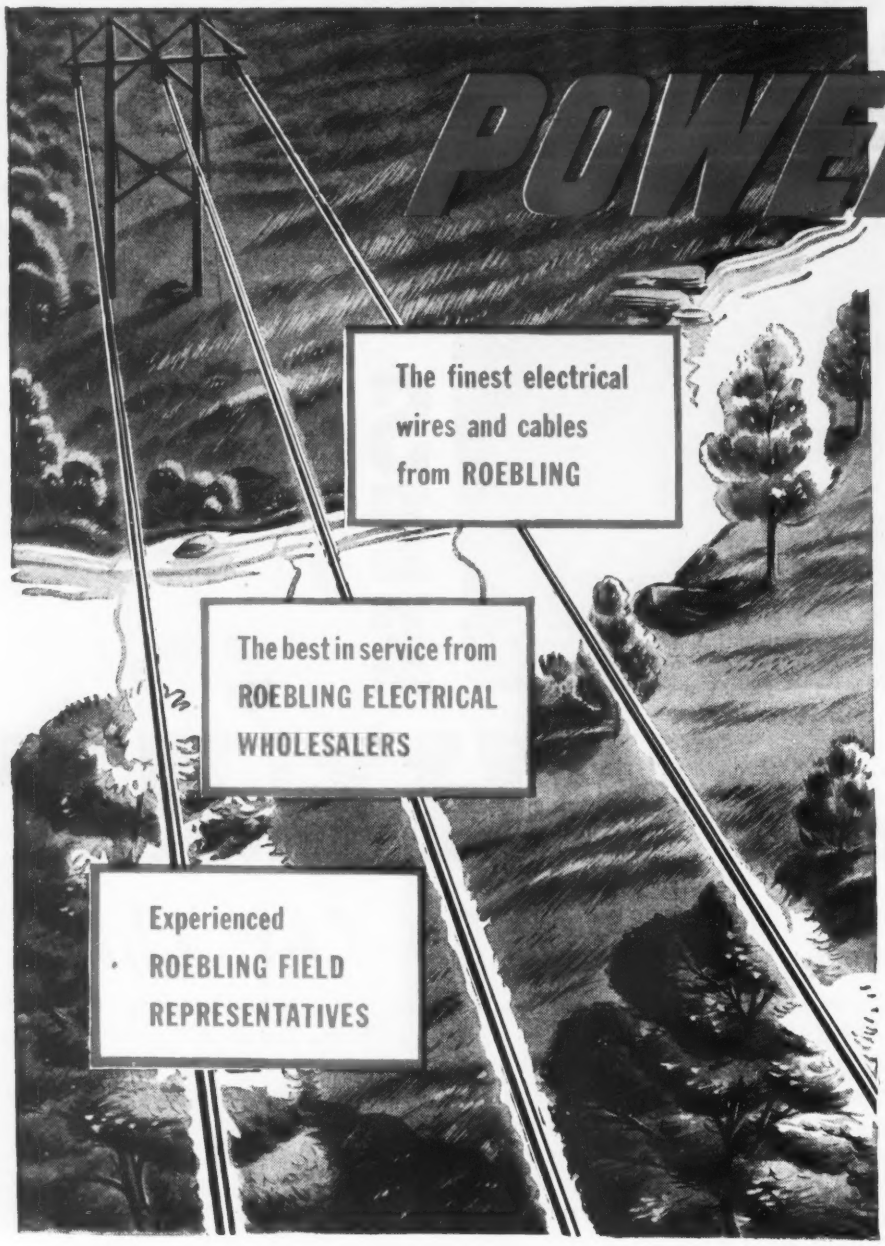
GA

WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC. • ELMIRA, NEW YORK

ROEBLING



POWER TO HELP YOU DO A BETTER JOB

WHEN TOMORROW'S COMPETITION SETS IN

HERE'S YOUR THREE LINE SYSTEM to give you extra power when the going gets tough. With tomorrow's competition—you'll need more than quality equipment alone. You'll need the best in service, too. And you'll get it from Roebling Electrical Wholesalers . . . Roebling Field Representatives: *when you need it . . . where you need it . . . and at the right price.*

We're doing our part today to see that you get Roebling wire and cable that embodies every modern development—made of the finest materials available.

To meet tomorrow's competition—look to Roebling quality products and service... Roebling Electrical Wholesalers. *They're teamed for your future profits.*

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

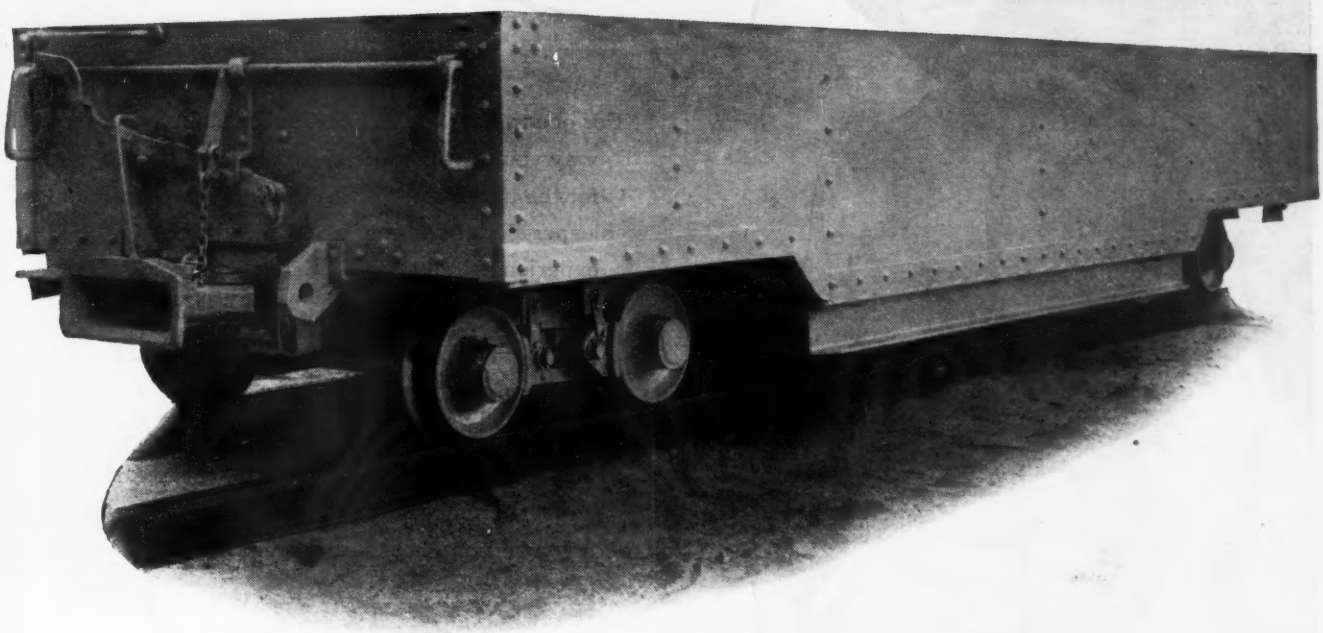
ROEBLING ELECTRICAL WIRES AND CABLES

WEATHERPROOF WIRE • SERVICE ENTRANCE CABLES • RUBBER COVERED WIRES AND CABLES (INCLUDING THIN-WALL INSULATED BUILDING WIRES AND CABLES) • RUBBER INSULATED POWER CABLES • PIGTAIL AND BRAIDED COPPER • TELEPHONE WIRES • RUBBER SHEATHED PORTABLE CABLES • BARE COPPER STRAND • MAGNET WIRE • VARNISHED CAMBRIC POWER CABLES • TROLLEY CONTACT WIRE

PACEMAKER IN WIRE PRODUCTS

why your dollar goes farther in a

BETHLEHEM ALL-STEEL MINE CAR



What are you actually buying when you order a Bethlehem all-steel mine car?

You're buying tops in durability, for no car stands up like a steel car. You're buying years of satisfactory service under tough, unpredictable conditions.

You're buying the utmost in good-running qualities, and you're hitting rock bottom in maintenance costs . . . because a Bethlehem all-steel mine car keeps rolling after other types have given up the ghost.

You're buying undivided responsibility, for Bethlehem builds all-steel mine cars from the wheels up—and stands behind the product.

And remember, Bethlehem can furnish you the kind of steel mine car you want—whether rotary-dump, end-dump, high- or low-side types. If you're interested in better haulage at lower cost, check with our engineers. They're old hands at the business of designing good mine cars.

★ BETHLEHEM STEEL ★

A different Johnny is marching home

For one thing, he won't parade up Main Street the way you always expected. He doesn't much care for the ticker tape and bunting. By day coach or sleeper, Johnny is coming home with the experiences of battle vivid in his memory.

He may be back for the job he left when the call to colors came. You know you'll be proud and happy to have him with you.

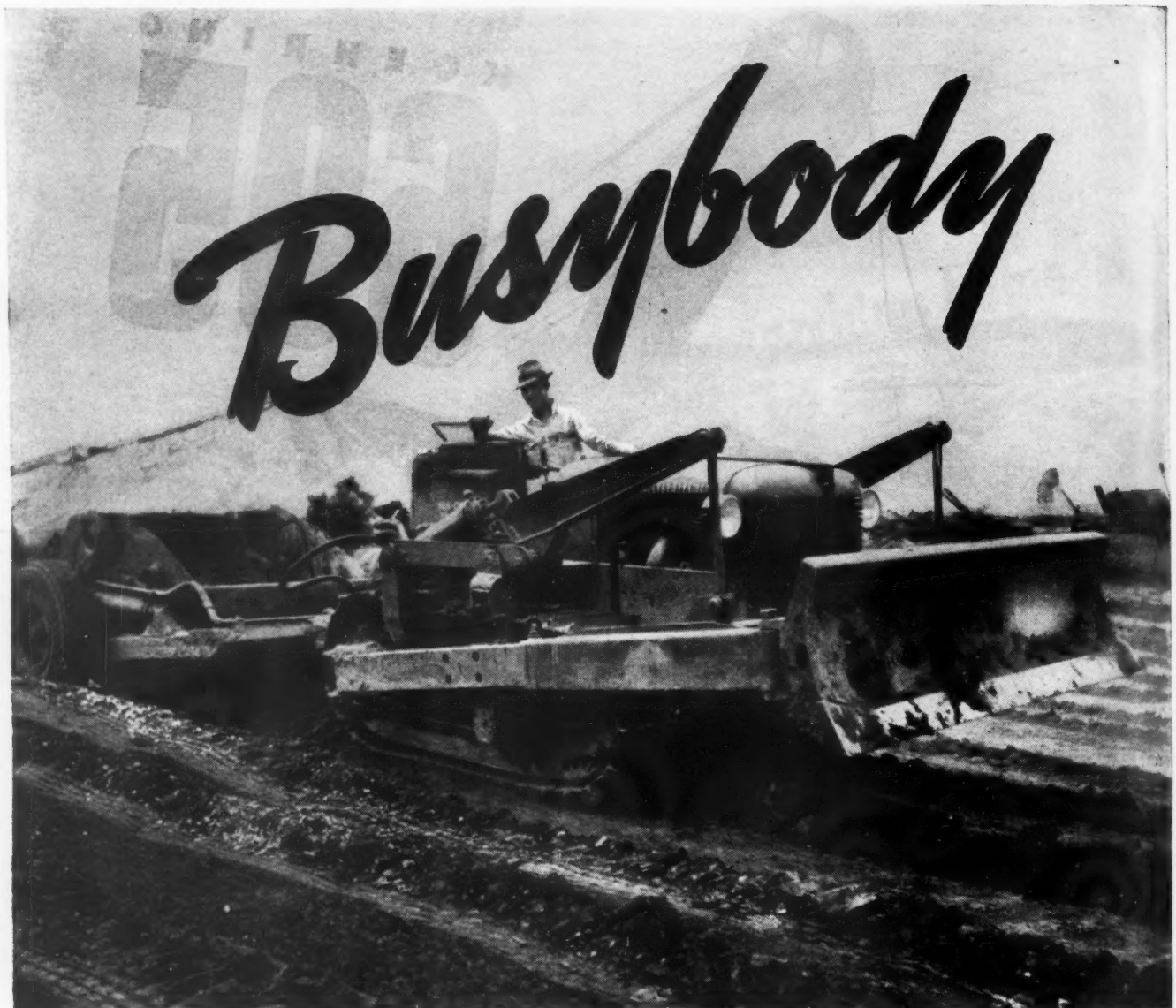
But it's a *different* Johnny. Not quite the happy-go-careless guy you knew before. He's older for one thing. More thoughtful. You may even find him brusque or restless now and then.

Why?

When a man's been through the hell and pandemonium of battle . . . or the terrible boredom of lonely, inactive outposts, it's hard to readjust to a paradise of peace and plenty. It will take Johnny time to settle in a civilian groove, and the call's on you for friendly tact and patience.

Pull with Johnny. Give him time to come through at home, as he came through on the fighting front. Play ball with Johnny. He made a swell soldier. And he's going to make a swell civilian.

MACWHYTE COMPANY, 2931 Fourteenth Avenue, Kenosha, Wisconsin . . . manufacturers of "Hi-Fatigue" Aircraft Cable, "Safe-Lock" Cable Terminals, Aircraft Tie-Rods, Braided Wire Rope Slings, and Wire Rope for all requirements.



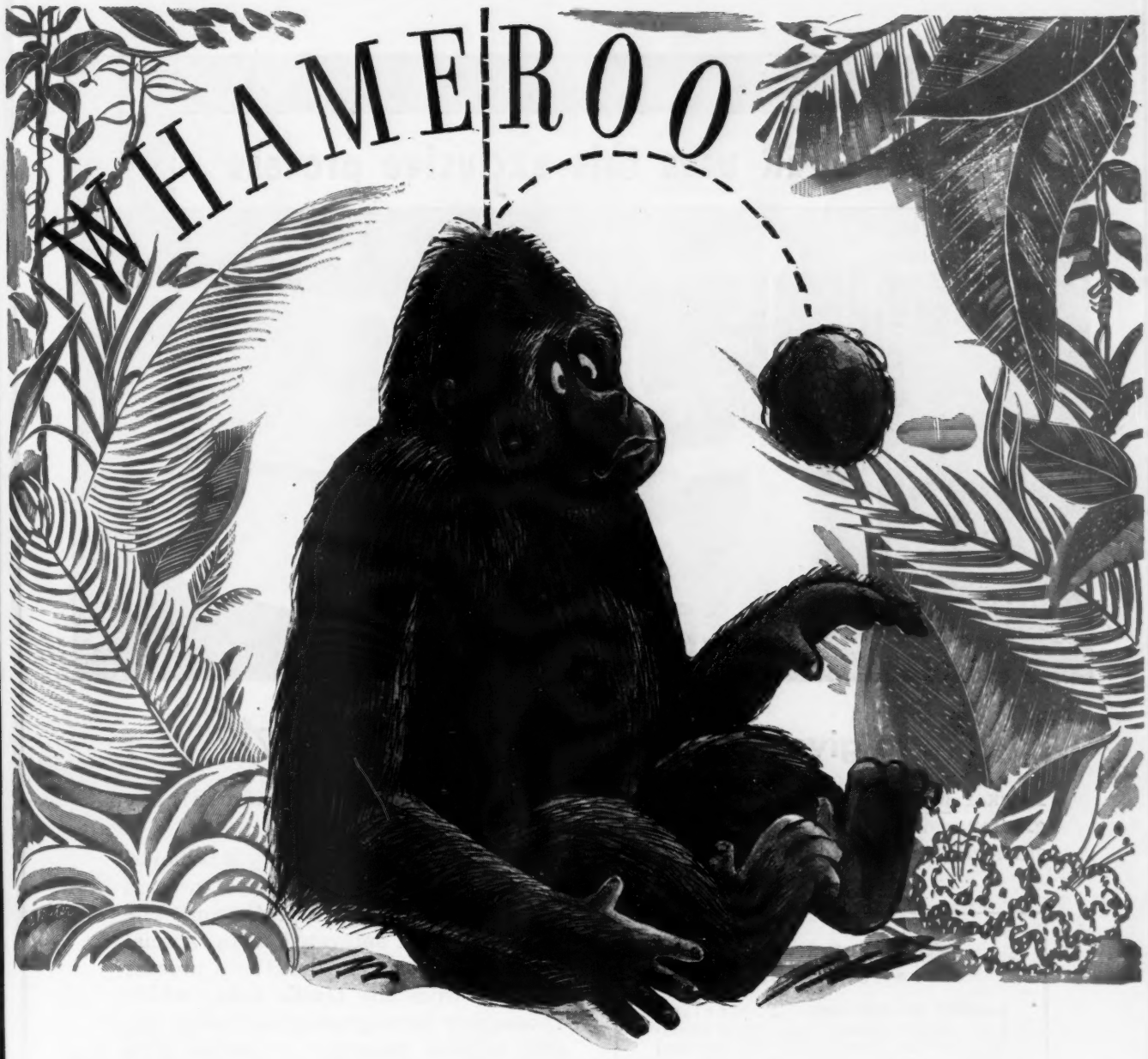
MODEL **HD-7** 2-CYCLE DIESEL. *Powerful.. Fast.. Low Cost Operation*

Never a rest for this outfit . . . keeps going from one job to another. Model HD-7 with bulldozer and 2-wheel scraper is a popular combination with miners. Strips, builds roads, clears, cleans up pits, moves machinery. On bulldozing — digs and pushes dirt, moves rock, grubs out trees and stumps. On hauling — carries material any distance, rear-dumps up or over slopes or on the level. Just the right power and speeds to handle tough jobs quickly — 60 drawbar h.p., speeds to 6.27 m.p.h. Starts and operates on low cost Diesel fuel.

A substantial number of HD-7's are available for the mining industry. For quick delivery, place your order with your Allis-Chalmers dealer NOW.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

2-Cycle
THE MODERN DIESEL POWER



A hard-headed gorilla may not mind being hit by one coconut. But repeat it several hundred times and he'll never be the same.

U. S. Royal Cords and Cables get worse treatment than that. We smack them more than 2,000 times with a 27½ pound hammer falling free. It's one of the ways we find out if they can take all the rough handling you'll give them on a rough job.

We really give U. S. Royal Cords and Cables the works . . . test them for resistance to heat, cold, compression, twisting and stretch . . . tough treatment, worse than they'll ever get in normal use.

THE NEW U. S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue, Rockefeller Center, New York 20, N. Y. • *In Canada:* Dominion Rubber Co., Ltd.

SERVING THROUGH SCIENCE ***WITH ELECTRICAL CORDS AND CABLES***

. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

JOHN FLOCKER AND COMPANY

644 GRANT STREET, PITTSBURGH 30, PA.

Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope

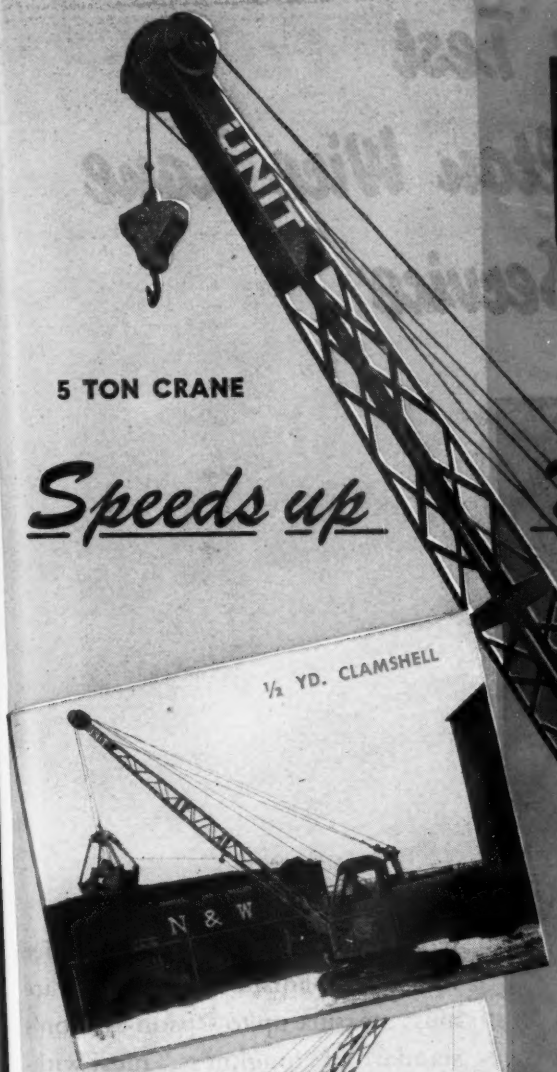
UNIT 514

5 TON CRANE

Speeds up Material Handling!

For speed, flexibility and unequalled performance, you just can't beat this UNIT 514. Ultra-modern in design, it has plenty of brawn and power to take hard, everyday punishment. Equipped with famous UNIT one-piece cast case to provide perfect alignment of all working parts. Low initial cost and low upkeep assures maximum economy over a long period of years. It will pay you to investigate.

Write for literature.



FULL VISION CAB

New, Full Vision Cab provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

CONVERTIBLE to All Attachments

Shovel . . . Clamshell . . . Dragline . . . Trenchoe . . . Magnet . . . Pile Driver . . . Back Filler.

UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

UNIT CRANE & SHOVEL CORP., Milwaukee 14, Wis., U.S.A.

A 4815-1P-C

The Tensile Test that helps Upson-Walton Wire Rope give Better Service

ILLUSTRATED above is an operator testing the tensile strength of the individual wires that go into Upson-Walton wire rope. It is only one of many tests, of both wire and the finished cable, which enables Upson-Walton to maintain its outstanding record of performance-satisfaction.

This is an important test because inferior wire would seriously affect the service life of the finished product. Wire must measure up to Upson-Walton's standard of "toughness," must withstand fatigue caused when the wires are bent over sheaves and drums.

If the wire does *not* measure up to those standards (and they are high ones!) it is rejected.

By this method of control, uniform strength is assured in Upson-Walton wire rope—which pays off in long service life and ultimately lower costs.

It's worth while specifying Upson-Walton for wire rope—LAYRITE for *Pre*formed.

U-W

Established 1871

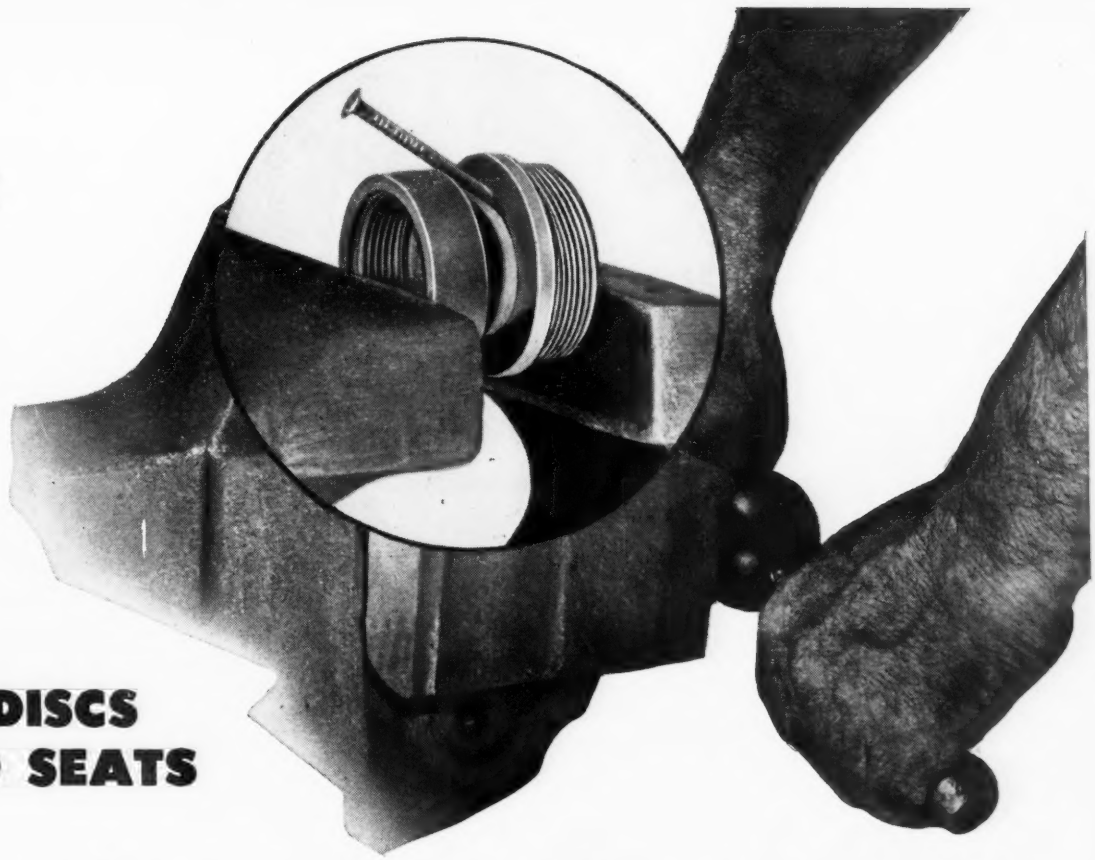
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 — 737 W. Van Buren Street, Chicago 7 — 241 Oliver Building, Pittsburgh 22

Number 225P—Globe
Number 227P—Angle



WITH DISCS AND SEATS

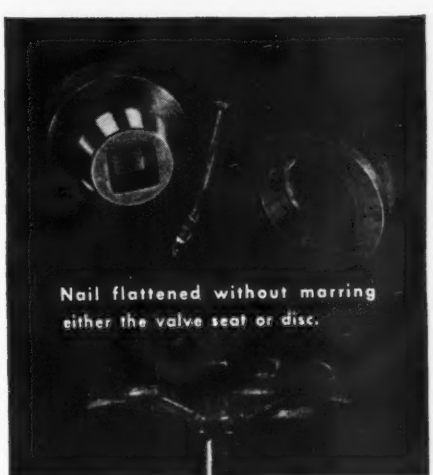
Hard Enough to Crush Nails

. . . The WALWORTH No. 225P Bronze Valve cuts maintenance costs to the bone

THE Walworth No. 225P is the hardest . . . toughest Bronze Valve your money can buy. Its stainless steel seats and discs, heat treated to 500 Brinell (hard enough to crush nails) can be closed on boiler scale, sand, grit, and similar abrasive particles without marring the seating surfaces. "Wire drawing" is eliminated. Even after years of severe service it will assure tight, positive shut-off.

Further, every other part of Walworth No. 225P has been designed and constructed to afford full protection against wear and leakage. Available in both globe and angle types (angle type No. 227P) in sizes from ¼" to 2", this quality valve is recommended for superheated steam up to 500 F, and 1000 pounds non-shock service on cold oil, water, gas or air.

For complete data on this long-life, economical Walworth Bronze Valve see your nearby Walworth distributor, or write for Catalog No. 42. The catalog gives all information, including sizes, dimensions, specifications and list prices on this, as well as Walworth's complete line of valves and fittings.



Nail flattened without marring either the valve seat or disc.

14 AWARDS TO 4 PLANTS

WALWORTH

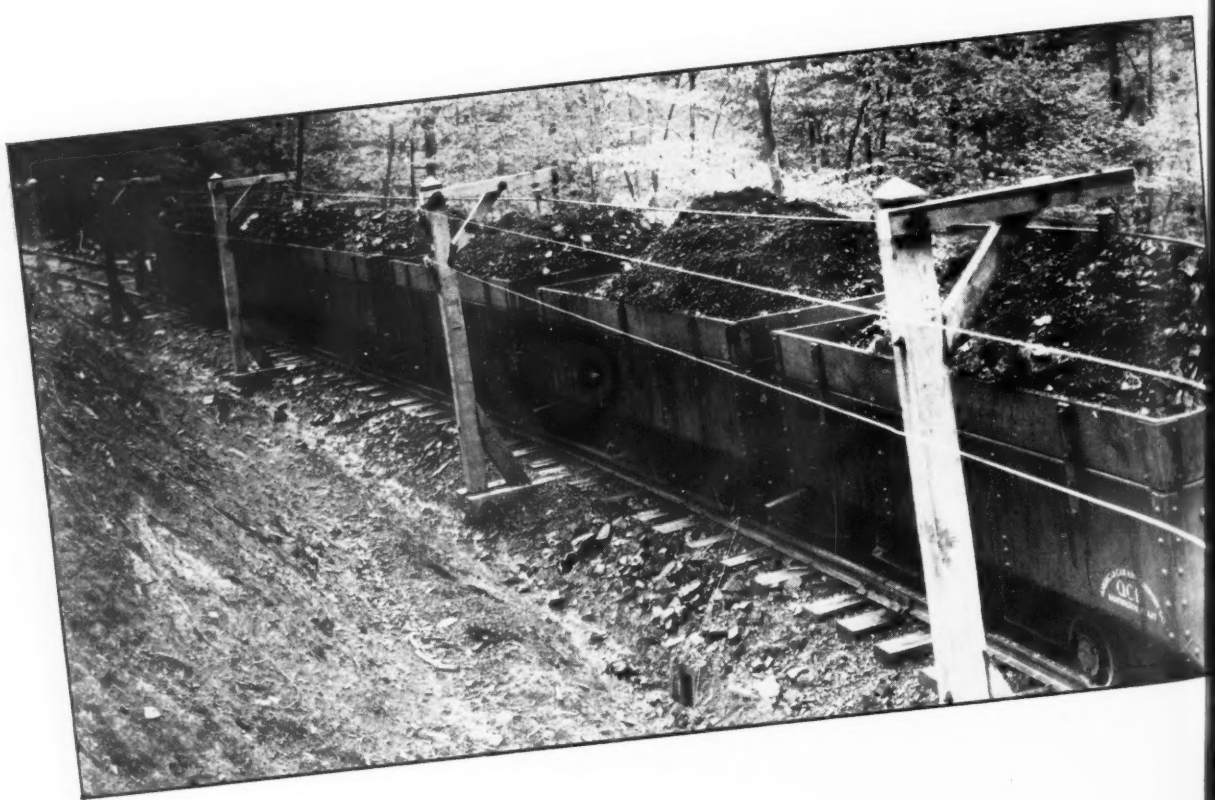
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

One million tons f

in



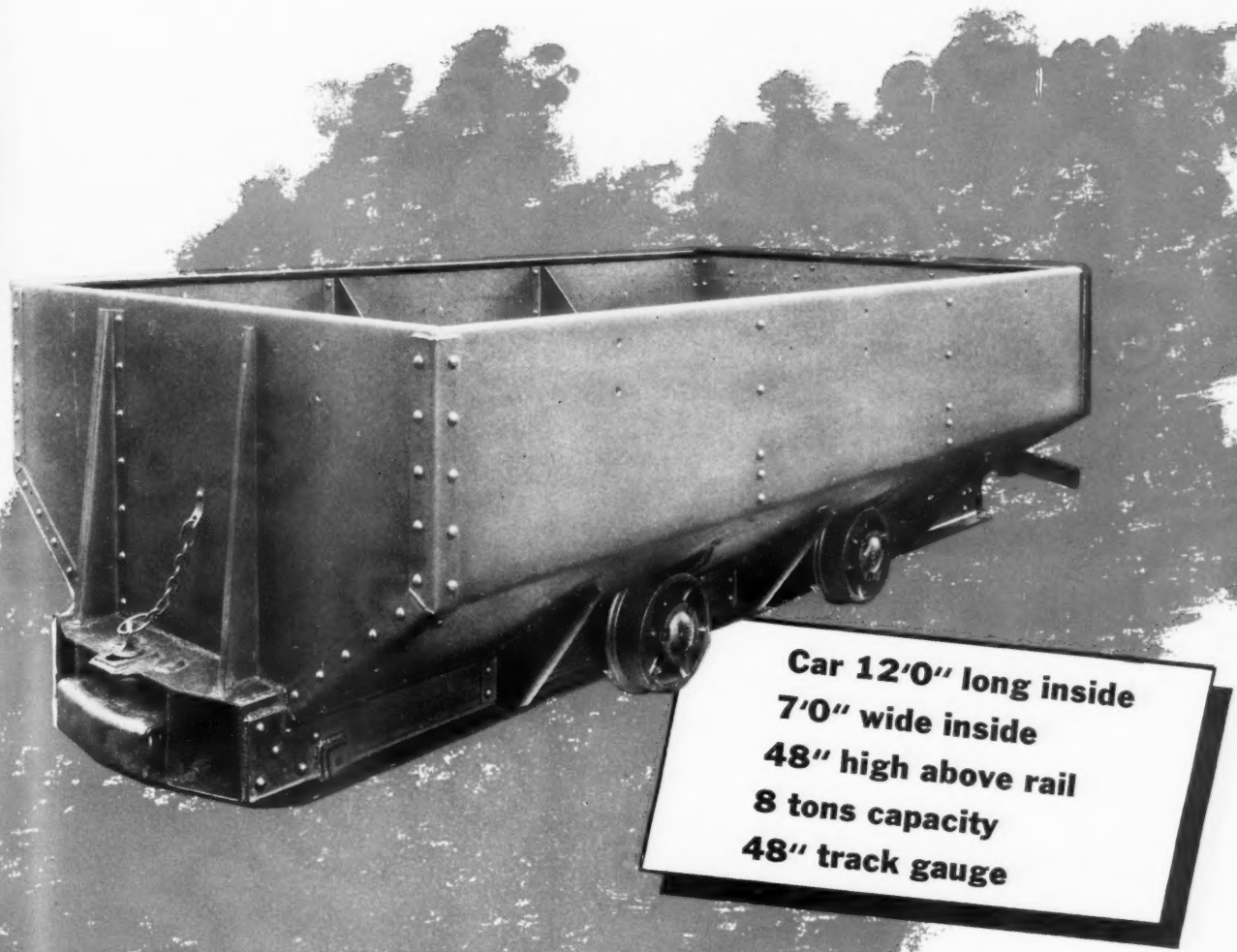
The Gay Mining Company at Timbar, West Virginia, with only 20 A.C.F. Drop-Bottom Cars, mined one million tons of coal in 35 months. The haul is 1¾ miles one way. Engineering and construction features of A.C.F. Drop-Bottom Mine Cars make records such as Gay Mining Company's; possibly in your mines also. Such car features as all-welded end-sill construction, double-acting spring bumpers and many others to be had in A.C.F. cars only. Contact your nearest A.C.F. office.

A.C.F. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals — better for mine car wheels than steel or iron, alone.

f coal

ONLY 20 a.c.f. DROP BOTTOM CARS!

in 35 months and that is a lot of coal



Car 12'0" long inside
7'0" wide inside
48" high above rail
8 tons capacity
48" track gauge

a.c.f.

AMERICAN CAR AND FOUNDRY COMPANY

New York • Chicago • St. Louis • Cleveland • Philadelphia • Berwick, Pa. • Pittsburgh • Huntington, W. Va.

Post-Mounted Set-up Flexibility

CP ELECTRIC COAL DRILLS

THIS CP No. 574 Permissible Electric Coal Drill is typical of one of the various possible combinations for making up a complete drill assembly. CP furnishes these drills on the basis of combinations of motor, hookup, post, boot, clutch, boxing, thread bar, auger and cutter heads to meet your specific drilling conditions. For full information write for Catalog 901.

CP manufactures the largest line of Electric Coal Drills: four sizes of the Post-Mounted type, five sizes of the Hand-Held models.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
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CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

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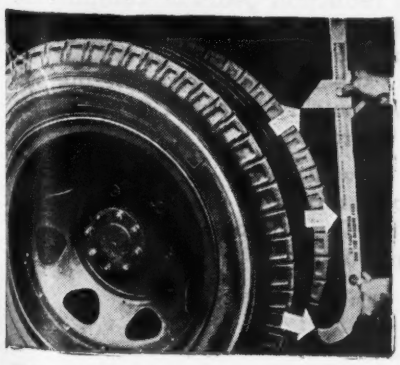
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

TRUCKERS HERE IT IS!

The "U.S." Dual Tire Matching Stick

Holding the curved end of the stick in one hand on the exact center of the tire tread, let the stick come down so that it touches between the curved end and the sliding piece. Then move the sliding piece up so that its lowest point touches the tread. Remove stick without disturbing sliding piece, and read actual diameter on the scale.



THIS Dual Tire Matching Stick is an exclusive "U. S." development—another important United States Rubber Company contribution to tire conservation. Correctly matched dual tires mean more miles per tire—fewer tire failures—fewer road delays—and more profits per ton mile. In one simple operation it measures the actual outside diameter (or standing height) of tires. Only 30 inches long, it is handy and easy to use.

See Your U.S. Truck Tire Dealer for your Matching Stick TODAY!

U.S. TIRES

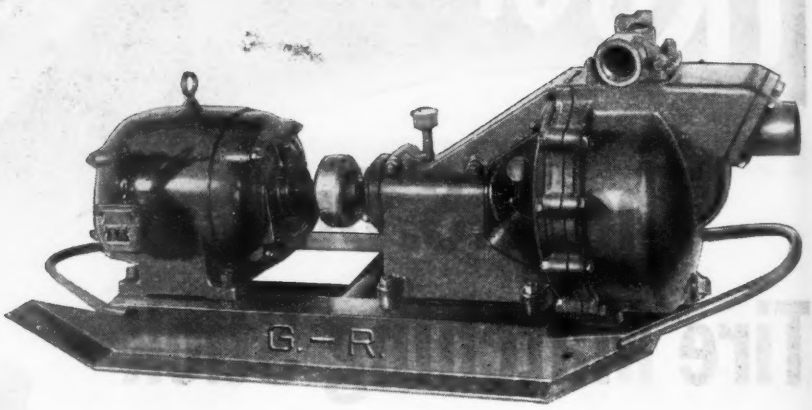
Serving Through Science

UNITED STATES RUBBER COMPANY

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony Program, CBS network, Sunday afternoon, 3:00 to 4:30 E.W.T.

1230 Sixth Ave., Rockefeller Center, New York 20, N. Y.

3 REAL ADVANTAGES of GORMAN-RUPP GATHERING PUMPS



Gorman-Rupp mine gathering pumps are made to operate unattended – a real advantage in mining practice. This comes through advanced Gorman-Rupp design.

First, these centrifugal pumps are completely self-priming. Prime is never lost and no adjustment is required between prime and run. A Gorman-Rupp mine pump easily primes through 200 feet of 2-inch suction line.

Second, these pumps are not clogged, obstructed or damaged by muck or solids. They go right on delivering water.

Third, good construction and extreme simplicity account for indefinite running time without shut-down or maintenance. There is only one moving part – the impeller. There are no reduction gears or complicated valves. When replacement of parts finally becomes necessary, this can be done quickly and easily by any mechanic without special tools, and on the job down in the mine. A quickly-renewed wear plate greatly simplifies this operation.

For automatic or remote control, as well as for all regular water-gathering service, Gorman-Rupp pumps will bring you a new kind of reliability. Write for full information or specialized Gorman-Rupp mine pumping equipment.

GORMAN-RUPP PUMPS — ARMY E NAVY — UNSURPASSED FOR PUMPING FAST

THE GORMAN-RUPP COMPANY

MANSFIELD • OHIO

BUILT FOR "MILEAGE"

Westinghouse 8-ton cable reel locomotive serving mechanical loading machine at face, feeding empty cars to loader, hauling loaded cars to relay locomotive haulage road in Maiden Mine of Kelly's Creek Colliery Co. Rome "60-38" cable is shown in use.

Rome "60-38" Single Conductor Locomotive Gathering Cable

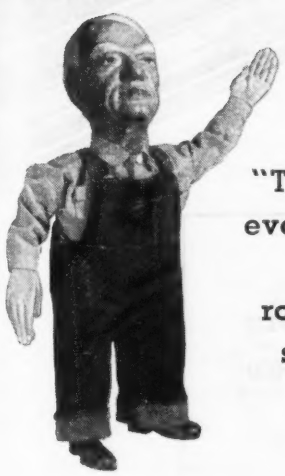
There's extra "mileage" built into every inch of this tough cable, which is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

A SPECIAL INSULATION is used having high electrical qualities and extreme adhesion to the copper conductor, preventing separation of the conductor from the jacket.

HEAVY TWINE REINFORCEMENT CORDS are applied over the insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead moulds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.



"This cable's got everything it takes to stand rough treatment," says **Romey**

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

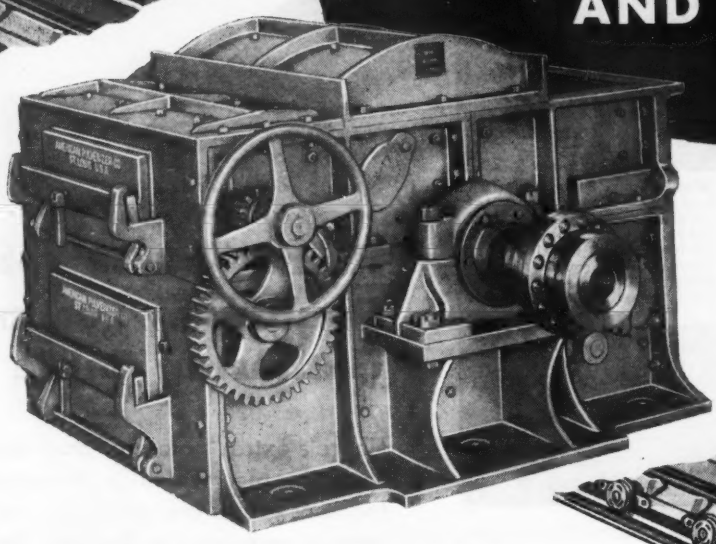
ROME • NEW YORK

THROUGH SPLITTING INSTEAD OF CRUSHING COAL AMERICANS BETTER PRODUCTION AND PROFITS

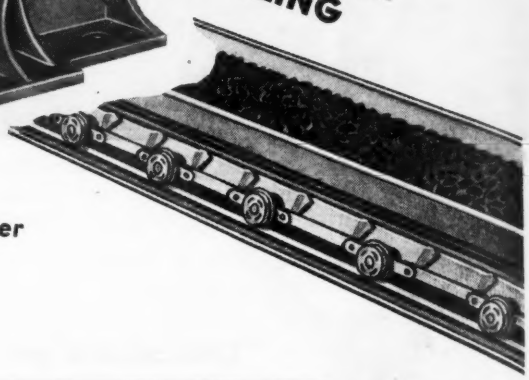
GREAT RANGE OF REDUCTION

American "AC" Rolling Ring Crushers readily increase production with their high capacities — up to 500 TPH. There's an American "AC" custom-made model to fit each one-step or circuit operation. ROM coal up to 28" is reduced to domestic stoker sizes and commercial screenings.

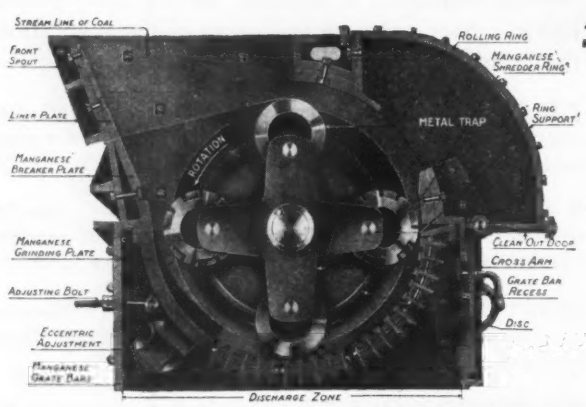
The splitting action of Americans produces a uniform product with no oversize and with complete control of fines.



UNIFORM SIZING



American "AC" Crusher



Only AMERICAN has the SHREDDER RINGS

The slow speed operation and the patented American shredder rings are two of the American features that enable superior performance.

The cross-section view of the American's simple rugged construction demonstrates its positive efficient operation of the shredder rings which split coal to clear cut sizes governed by the easy external adjustment of the breaker plate. Crushing chamber, grate bars, and shredder rings are of manganese steel.

Heavy, reinforced, cast frame sections are machined and fitted dust-tight at joints. Massive rotor centered on heavy alloy steel shaft, precision machined, has anti-friction bearings, and mounted in grease lubricated dust-tight pillow blocks.

Manganese steel shredder rings, each have 20 cutting edges. Revolving freely at terrific centrifugal force, they deflect from tramp metal, unharmed. No shear pins or conventional safety devices are required.

Send for Informational Literature and Specifications

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

3-CAR PACKAGED POWER

Car No. 1—all the a-c equipment
Car No. 2—the transformer
Car No. 3—the Ignitron Rectifier and the d-c equipment

THE AIR-COOLED TRANSFORMER IS One IMPORTANT REASON WHY Two OUT OF EVERY Three MINE OPERATORS CHOOSE Westinghouse

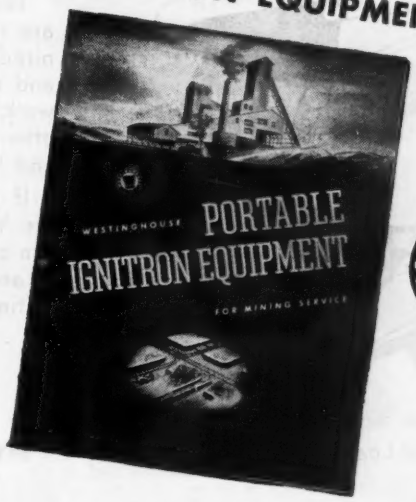
Development of the Westinghouse Type ASL *Air-Cooled Transformer* was a major step forward in the safety of underground equipment. Since no cooling liquids are required, fire and explosion hazards are eliminated. This is one of the important reasons why two out of every three users of portable equipment choose the Westinghouse Ignitron Rectifier train.

Space is another important consideration. The Westinghouse Air-Cooled Transformer occupies less than two-thirds of the space required by a liquid-filled transformer. This makes it possible to provide a small, compact, three-car unit . . . light in weight and easy to handle.

Ignitron portable power units are now in use on all types of heavy-duty service in coal, iron, zinc, copper and salt mines. They are ideally suited for mining use. Dust, dirt, fumes, heat, dampness or condensation have no effect on the operation of the air-cooled transformer. For complete information about Ignitron Rectifier Equipment, call your nearest Westinghouse office. Or, send for booklet B-3492 illustrated below. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-94668

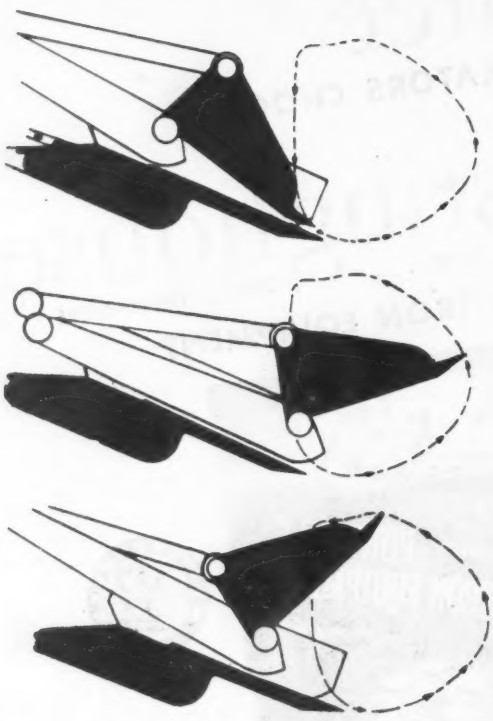
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

IGNITRON EQUIPMENT



This new booklet gives the full story of the portable Westinghouse Ignitron Rectifier. It contains the specifications of the four standard sizes built today—200, 300, 400 and 500 kw. Write today for your copy.

ELECTRICAL EQUIPMENT FOR THE MINING INDUSTRY



The Loader with the Exclusive Vertical Loading Action.

Like OLD Friends . . .

—THEY WEAR WELL!

● Do you pause now and then to think of Old Friends? Those old friends who wear so well . . . friends who can be depended upon when the going is tough? When you do, let it remind you of the Whaley "Automat", for, like old friends, the "Automat" is the long life machine . . . wears well, and you can depend on it when the going is tough.

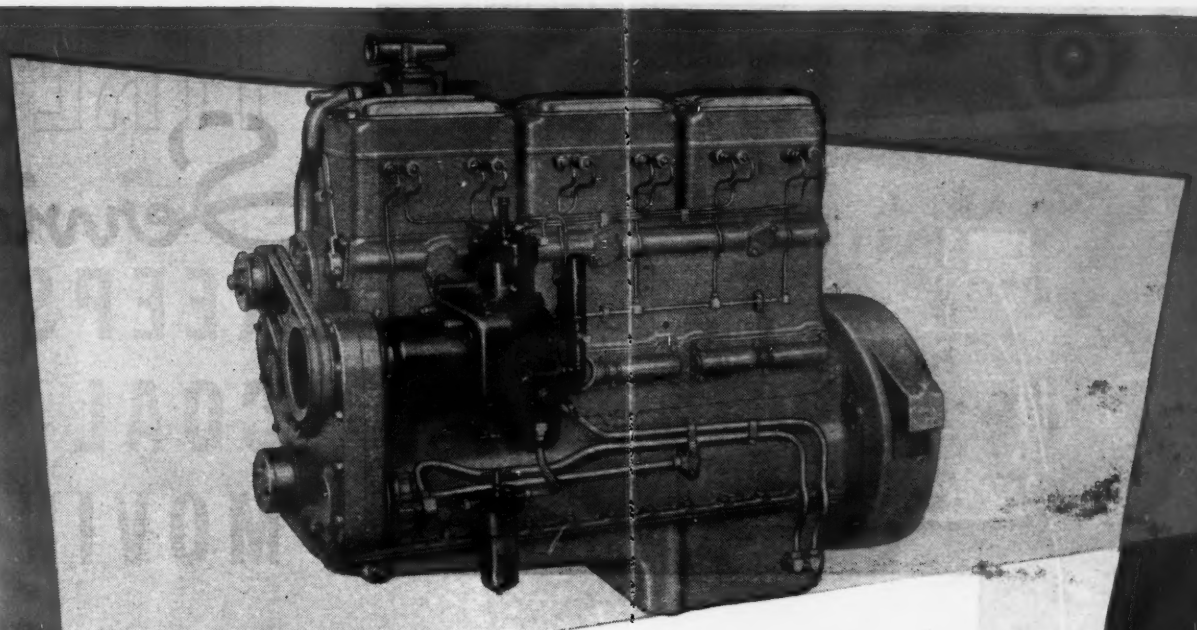
Today, Whaley "Automats", eight, ten and twelve years old, are still leading tonnage producers. The "Automat" is recognized as a fast, dependable coal loader. But, it is so designed and constructed that it will take the punishment of heavy rock work. Ask any man who operates Whaley "Automats" and other types of loaders what machine he uses in the tough places and the answer is always the same — the Whaley "Automat".

If you are thinking of mechanizing your mines, remember the WHALEY "AUTOMAT" can load any lump of coal that can pass through your tipple or any size rock your cars, larries or aerial tram can take. Please mention your conditions when writing for data on machines.

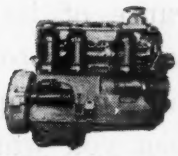
Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for Manufacture and Sale in Great Britain and Europe.

MYERS-WHALEY COMPANY, Knoxville, Tennessee

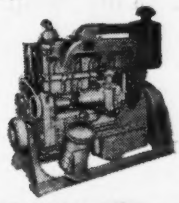
Mechanical Loaders Exclusively For Over 37 Years



The PROVED producer of low-cost tonnage



Model HB-600: Automotive engine, 6 cylinders, 4⅞" x 6", 150 hp. at 1800 rpm. (maximum).



Model NHI-600: Power unit, 6 cylinders, 5⅛" x 6", 200 hp. at 2100 rpm. (maximum).

Model NHPS-600: Supercharged power unit, 6 cylinders, 5½" x 6", 275 hp. at 2100 rpm. (maximum).

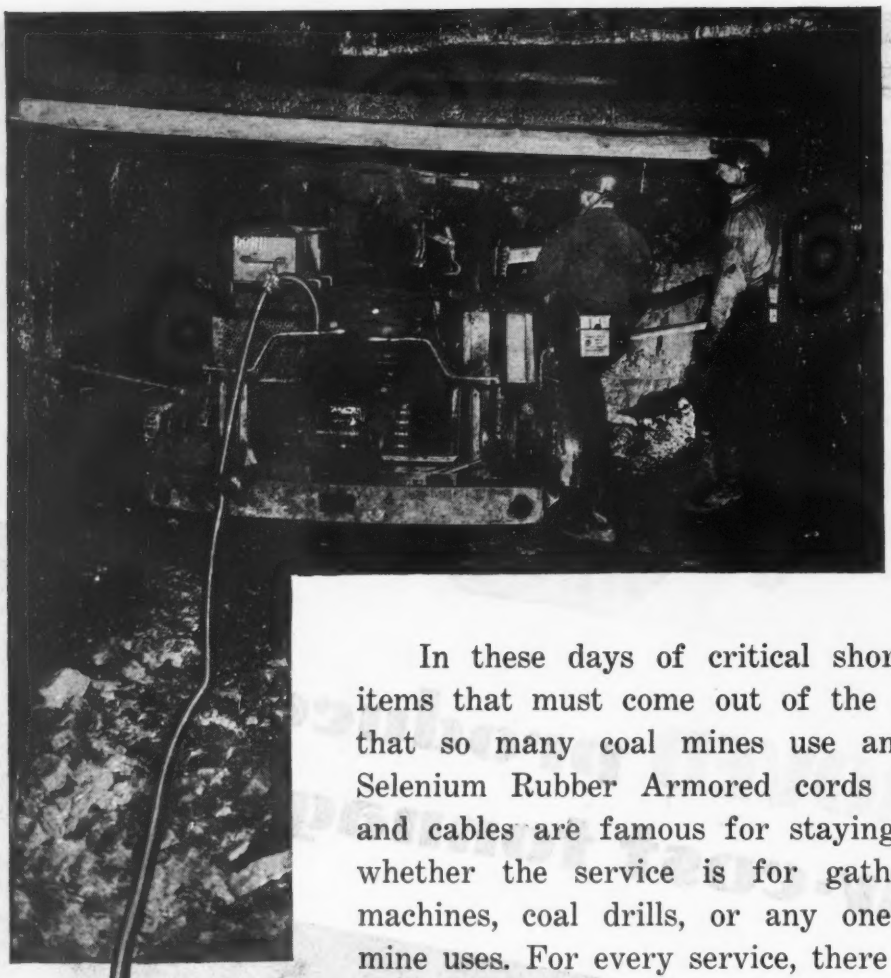
The line of Cummins Dependable Diesels includes automotive, portable, stationary and marine models—50 to 275 hp.

In choosing the prime mover for your new powered equipment, make sure that you get a *proved* producer of low-cost tonnage. That Cummins Diesel power is such a producer—a producer of *faster, cheaper* tonnage—has been demonstrated by its 12-year performance record in all types of strip and shaft mine power applications. As a result, Cummins Dependable Diesels are now standard with successful mine operators everywhere . . . are offered as standard or optional power by leading manufacturers of mining equipment.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

CUMMINS Dependable DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS



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In these days of critical shortages, coal is one of the items that must come out of the ground. That's the reason that so many coal mines use and specify Simplex-TIREX Selenium Rubber Armored cords and cables. TIREX cords and cables are famous for staying on the job regardless of whether the service is for gathering locomotives, cutting machines, coal drills, or any one of the many other coal mine uses. For every service, there is a TIREX cord or cable. On this job each TIREX cord or cable gives the same unfailing, uniform, dependable service.

Coal mines have found TIREX, because of its Selenium Rubber Armor, to be a very satisfactory answer to problems of rock falls, runovers, and like accidents that happen even in the best of regulated coal mines. When you want a cord or cable that will stand up to all the hazards that are present in coal mining service, specify TIREX. You won't be disappointed.

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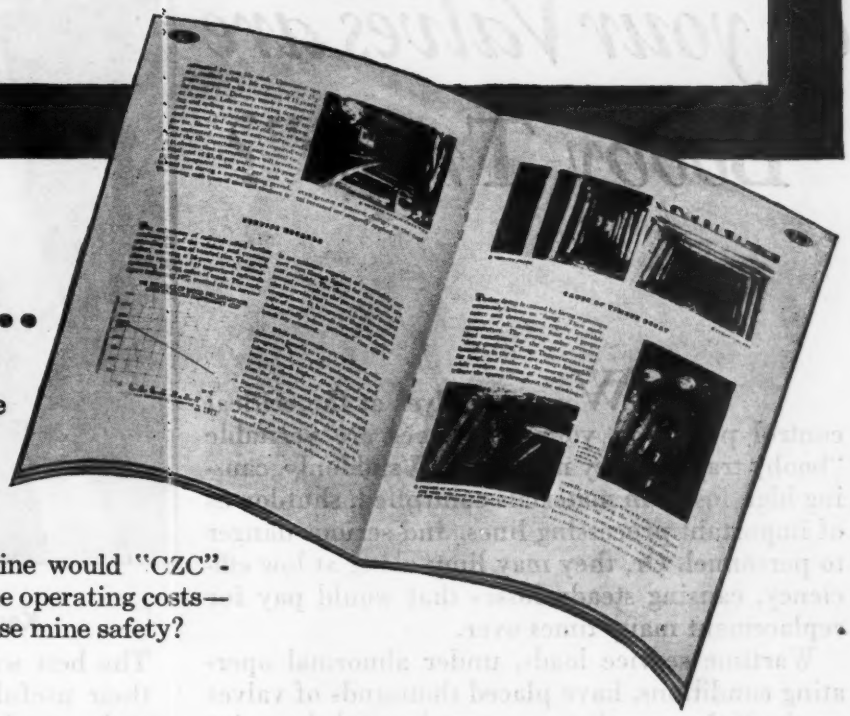
Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

ARMY E NAVY

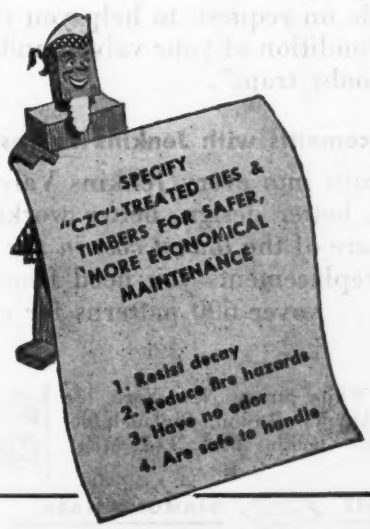
Simplex WIRES and CABLES

Can you answer these questions about your mine?



Do you know...

1. The life expectancy of a haulage tie?
2. How much you would save by using "CZC"-treated ties?
3. In what other parts of your mine would "CZC"-treated timber help you to reduce operating costs—improve mine efficiency—increase mine safety?



The answers to these questions and many others are found in the booklet, "Wood Preservation for Mines," published by Du Pont and sent to you free, on request. It is profusely illustrated and contains several charts of maintenance costs and research tests.

Chromated Zinc Chloride (CZC) is an improved wood preservative with which ties and timbers may be impregnated to resist decay, reduce fire hazards and increase, by as much as *six times*, their useful life!

Don't wait until you need or can get new timber before studying the advantages of "CZC." Write for the booklet, and be ready. Fill out the coupon below today.

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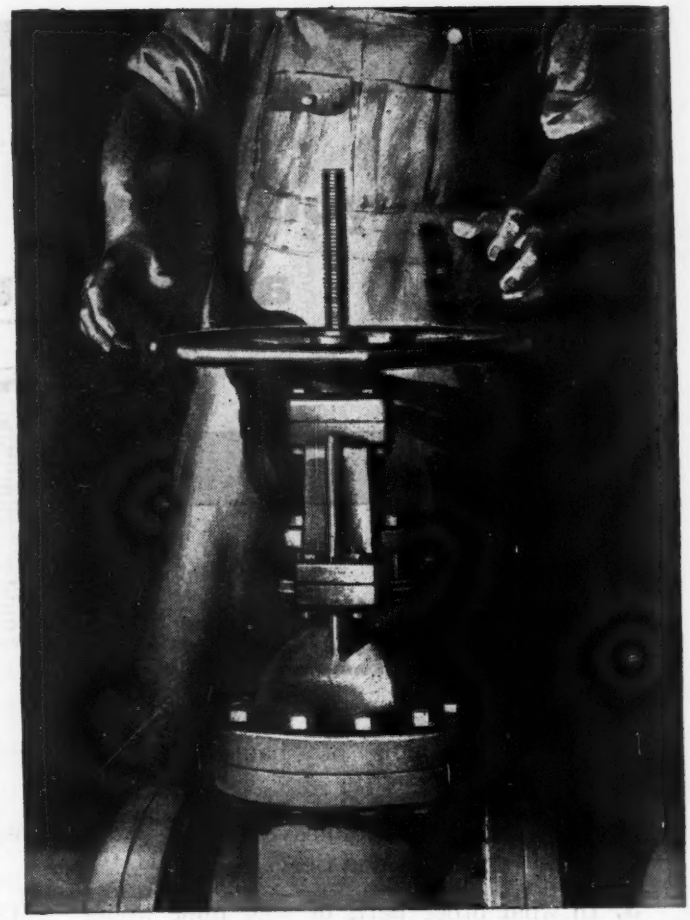
How Many of your Valves are "Booby Traps"?



Worn-out valves at the critical control points on your pipe lines are veritable "booby traps". They may "let go" suddenly, causing high losses in materials controlled, shutdowns of important processing lines, and serious danger to personnel. Or, they may limp along at low efficiency, causing steady losses that would pay for replacement many times over.

Wartime service loads, under abnormal operating conditions, have placed thousands of valves on the retirement list . . . worn beyond the point where they can be satisfactorily and economically reconditioned. How many are still in your pipe lines?

"NO 'BOOBY TRAPS' ON MY LINES!"

With the Jenkins Valve Record Sheets you can keep continuous data on any valve's condition, and tell when it will cost *less* to replace it.

Set down the condition of all important valves at each periodic inspection, and the frequency and costs of repairs and parts renewed.

For sample Record Sheets, send the coupon below.

Keep Records of Critical Valves

The best way to find when valves have outlived their usefulness – before they cause trouble – is to keep adequate maintenance records. Jenkins Engineers have prepared useful "Valve Record Sheets", available on request, to help you check and record the condition of your valves, and find the potential "booby traps".

Make Replacements with Jenkins Valves

Extra value is built into every Jenkins Valve by better materials, better design, better workmanship. To make sure of the *lowest cost in the long run*, select the replacements you need from the Jenkins Catalog . . . over 600 patterns for every service.

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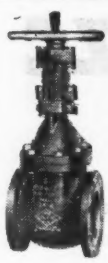

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PROFITABLE COAL STRIPPING WITH MARION

At the Windsor Coal Company's mine, Windsor, Missouri, this MARION 5323 knee-action coal stripper, equipped with a 15 cubic yard dipper, is handling approximately 435,000 cubic yards of rock and shale per month.

There is a dependable — high capacity — modern MARION of the proper size and type to solve your stripping problems. May we help you?

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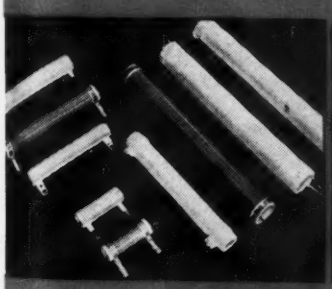
Dow Corning, pioneer in silicone product development, brings outstanding new efficiency to the mechanical equipment of American industry. In the enlarging family of DC materials are Fluids, Greases, Compounds, Insulating Varnishes and Silastic*, the new Dow Corning Silicone Rubber —products that extend the range of service temperatures well beyond the thermal stability of conventional organic materials. *TRADE MARK, DOW CORNING CORPORATION



SILASTIC-COATED RESISTORS operate successfully at 275° C. . . . qualify under Grade 1, Class 1 specifications by taking the plunge from 275° C. into ice water nine successive times. Silastic is available in coating, extruding and molding stocks.

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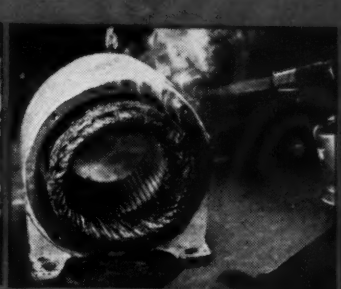

DC SILICONE INSULATION will not support combustion! Pictured are DC 993 varnished Fiberglas and mica insulated stator coils seven seconds after five-minute exposure to direct flame of a gasoline blow torch. As a result of this non-combustibility fire hazard is reduced.

DC 4 IGNITION SEALING COMPOUND is an ideal lubricant and seal for radio-shielded terminals and disconnect junctions. It excludes moisture, protects organic insulations, and neither hardens nor melts in the temperature range -40° F. to 400° F.

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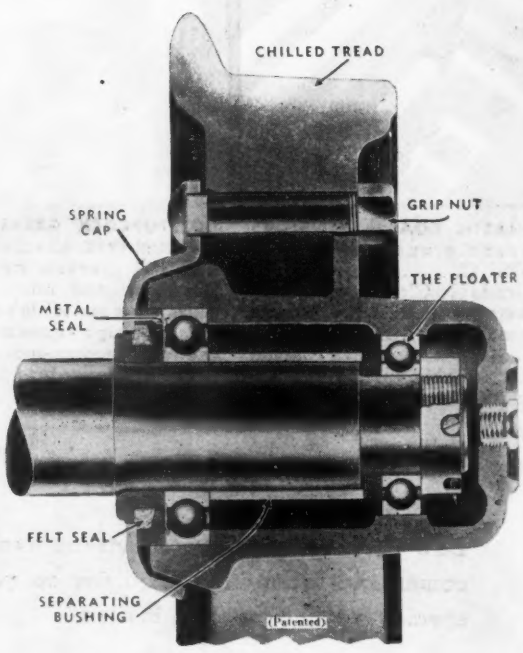
FIRST IN SILICONES

★ TO Mine Op
Who Want to Mo

Here is one of the S-D "Automatics" in a mine where each car was dumped from 12,000 to 15,000 times within the first 4 years, and with tonnage hauled averaging 140,000 tons per car. This is equal to 20 years of average dumping of mine cars. At the end of the 4 years the cars were still like new.

The wheel that moves more tonnage with less power consumption

The S-D "Floater" Ball Bearing wheel is, unquestionably, the easiest running mine car wheel available. Actual mine-operation tests have proved that "Floater" wheels permit great increases in net loads handled by locomotives, compared with wheels using other types of precision bearings. In addition, "Floaters" are guaranteed for 5 years, to protect you against wheel and bearing breakage or undue wear and against undue grease consumption. "Floaters" are truly a paying investment.



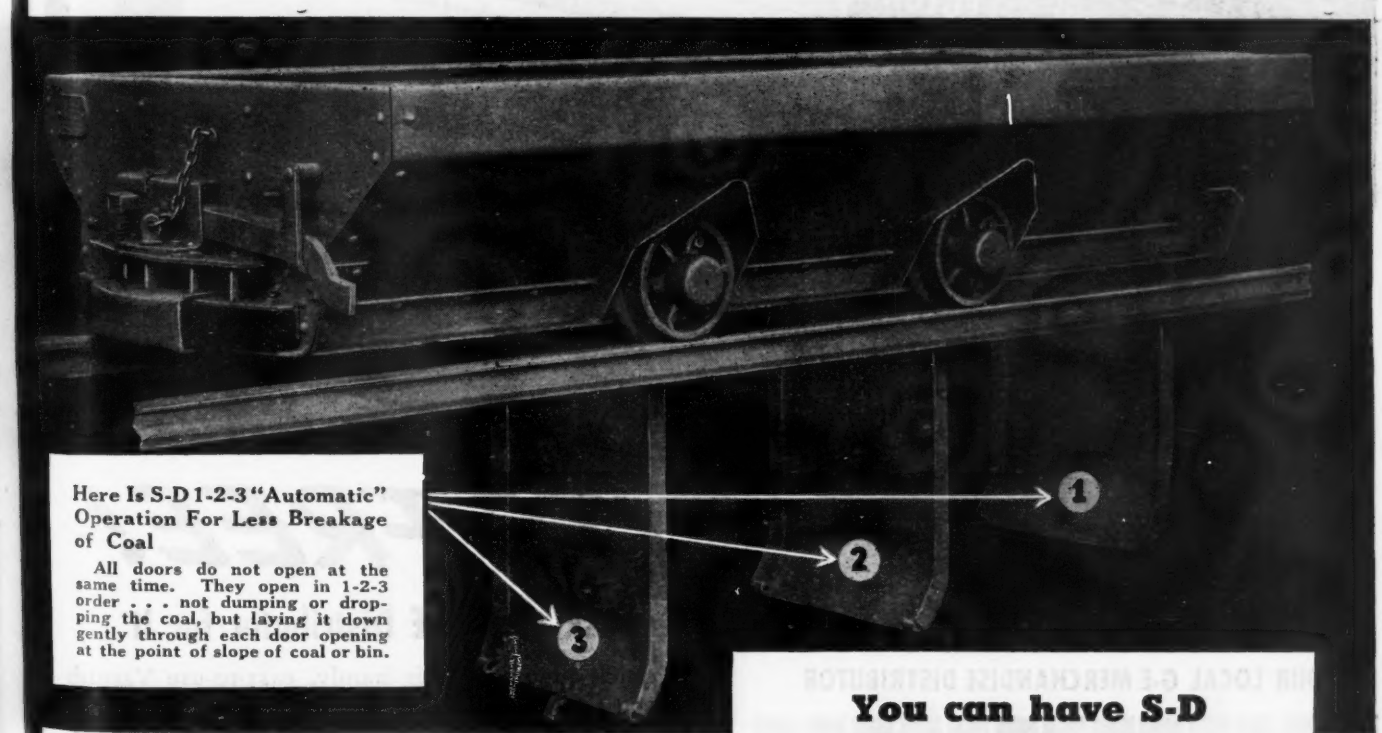
Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

Operators Move MORE COAL

★ We have recently been advised by a Company which "changed over" to S-D "Automatics" that for March, April and May 1942 (before the change-over) the output was 138,944 tons, representing 231,147 man-hours, whereas for March, April and May, 1943 (after the change-over) the output was 188,662 tons, representing 241,535 man-hours. Therefore, the increase in the output per man-hour was 30 per cent. This means a big saving, that you can calculate for yourself, and a saving which corresponds with previous reports from others.

This, by no means, is an unusual case. On the contrary, this record of moving more coal at less cost is the typical result at numerous mines that have "changed over" to S-D "Automatics".

Another mine using only 40 S-D 1-2-3 "Automatics", averaging 5 to 6 tons per car per trip and with a round trip haul of 2 miles, is producing 1200 to 1425 tons per 7-hour shift. This means that each car is averaging more than 6 round trips per 7-hour shift. It shows also that no time is lost in hauling or discharging coal — a saving of time that is possible only with "Automatics" . . . a saving of time that means moving more coal and at less cost.



Here Is S-D 1-2-3 "Automatic" Operation For Less Breakage of Coal

All doors do not open at the same time. They open in 1-2-3 order . . . not dumping or dropping the coal, but laying it down gently through each door opening at the point of slope of coal or bin.

REPAIR OR REPLACEMENT WHEELS

Every month we add new customers to our list of users of high quality wheels. Send us your repair wheel orders and start reducing your replacement and maintenance costs with wheels produced by our patented annealing process. And remember this, we are prepared to furnish you with extra CAR BUMPERS, DRAWBARS, AXLE BOXINGS, AXLES, SHEAVES AND ROLLERS.

You can have S-D "Automatics" On a Liberal Rental Plan

You don't have to buy S-D "Automatics". You can take advantage ofour Rental Plan and your savings will more than pay the rentals. And, if you prefer later to own the cars, you can exercise your option to buy them. Write to us about this unusual offer.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

NOW Get the Right Varnish for that Insulating Job

Quickly-Easily-Accurately...

WITH THIS HANDY VARNISH SELECTOR

IT'S FREE!

Ask your G-E Distributor for it

A quick glance at this handy, easy-to-use Varnish Selector gives you all the facts on 7 outstanding insulating varnishes — characteristics, applications, baking and drying time, base, thinner, viscosity — everything you want to know. Ask your local G-E Merchandise Distributor for one and you'll always have this essential information at your finger tips, ready to use. A list of G-E Distributors is available on request from Section RIM252-11, Resin and Insulation Materials Division, General Electric Company, Schenectady 5, New York.

SEND THIS COUPON NOW TO YOUR LOCAL G-E MERCHANDISE DISTRIBUTOR

Gentlemen:

Please send me a G-E Insulating Varnish Selector as offered in Coal Age.

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GENERAL ELECTRIC

GOOD SHOW for spectators is the scoop shovel handled by a smart operator in the typical big building excavation.

GOOD SHOWING for the contractor, however, depends on the sinews of the scoop shovel . . . the wire rope is a factor in both time and costs.

GOOD SERVICE in wire rope is not obvious to spectators. But on any kind of a job, the maintenance records show the obvious value in Rochester ropes . . . because they last longer, deliver more work between replacements . . . Available in increasing quantities as government contracts are filled. Order now for earliest delivery.

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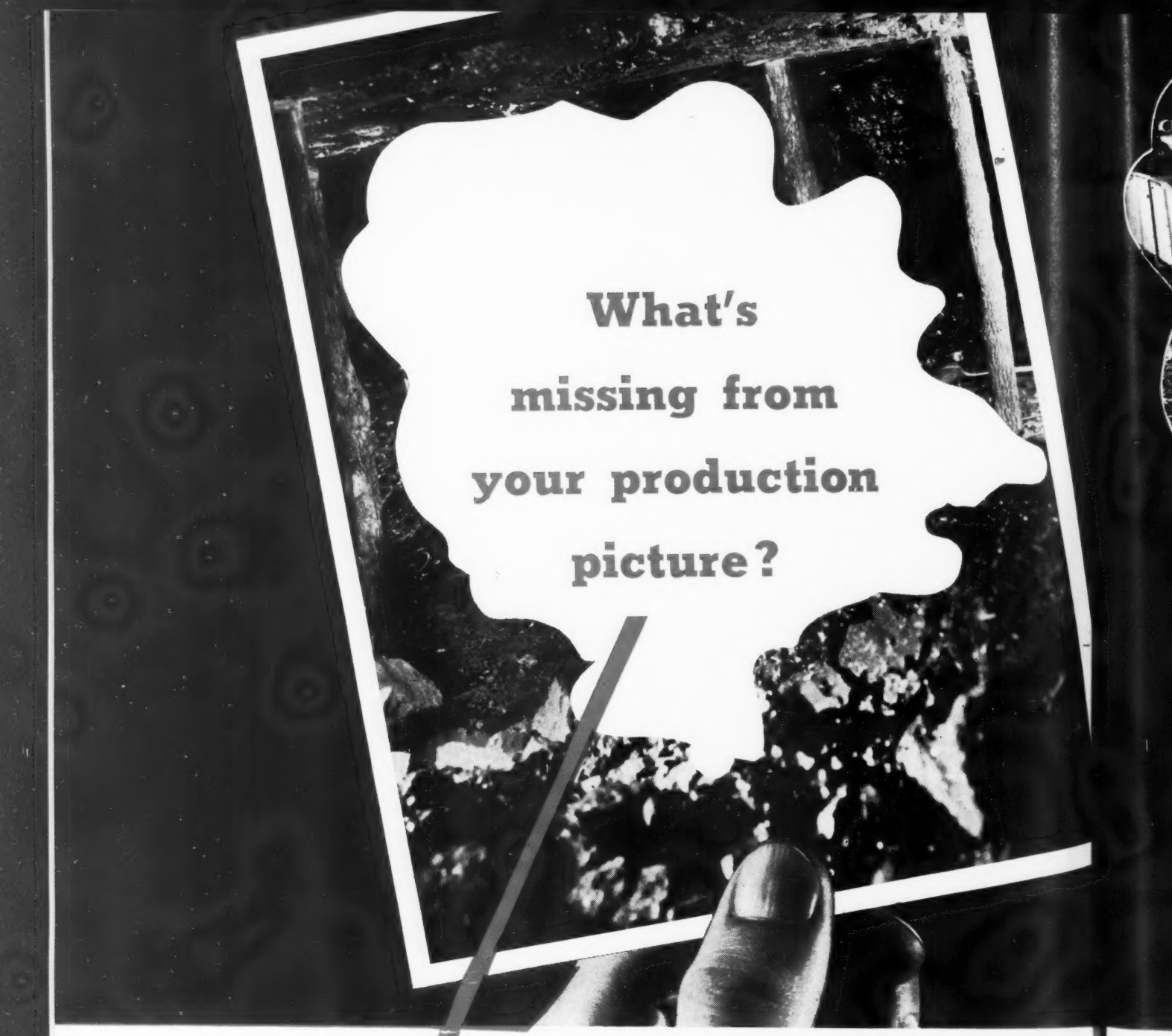


If it is fast, economical loading...

JOY LOADERS

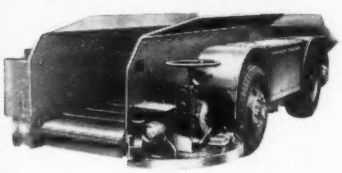
CAN INCREASE OUTPUT— LOWER COST!

An idea of the volume of coal the Joy 11 Bu can handle at one time may be gained from this photograph.

Almost every efficiency study undertaken in mines, before and after installation of mechanical loaders, shows that loading machines increase production tremendously when properly used.

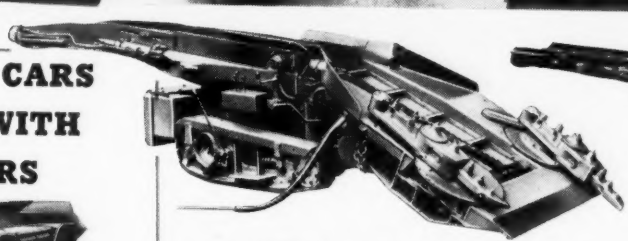
The installation of loaders in themselves, cannot always accomplish miracles of production increases . . . they must at times be used in coordination with supporting equipment. An intelligent study of your production problems will show how they can do their best work for you. In making such an analysis, a Joy Engineer can be of great help.

JOY SHUTTLE CARS WORK BEST WITH JOY LOADERS

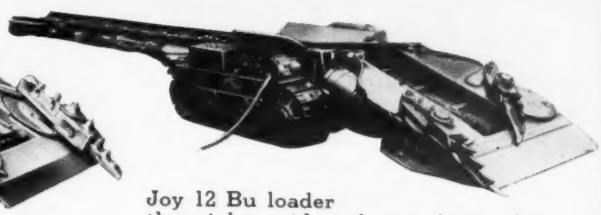


Joy 42" Shuttle Car . . . the workhorse of many types of mines inside and outside of the coal industry.

Joy 32" Shuttle Car . . . equipped with cable reel or battery; right or left-hand drive; reversible controls.



Joy 11 Bu loader . . . high capacity machine for use in deep seams.



Joy 12 Bu loader
the mighty midget that works wonders.

Call in a Joy Engineer

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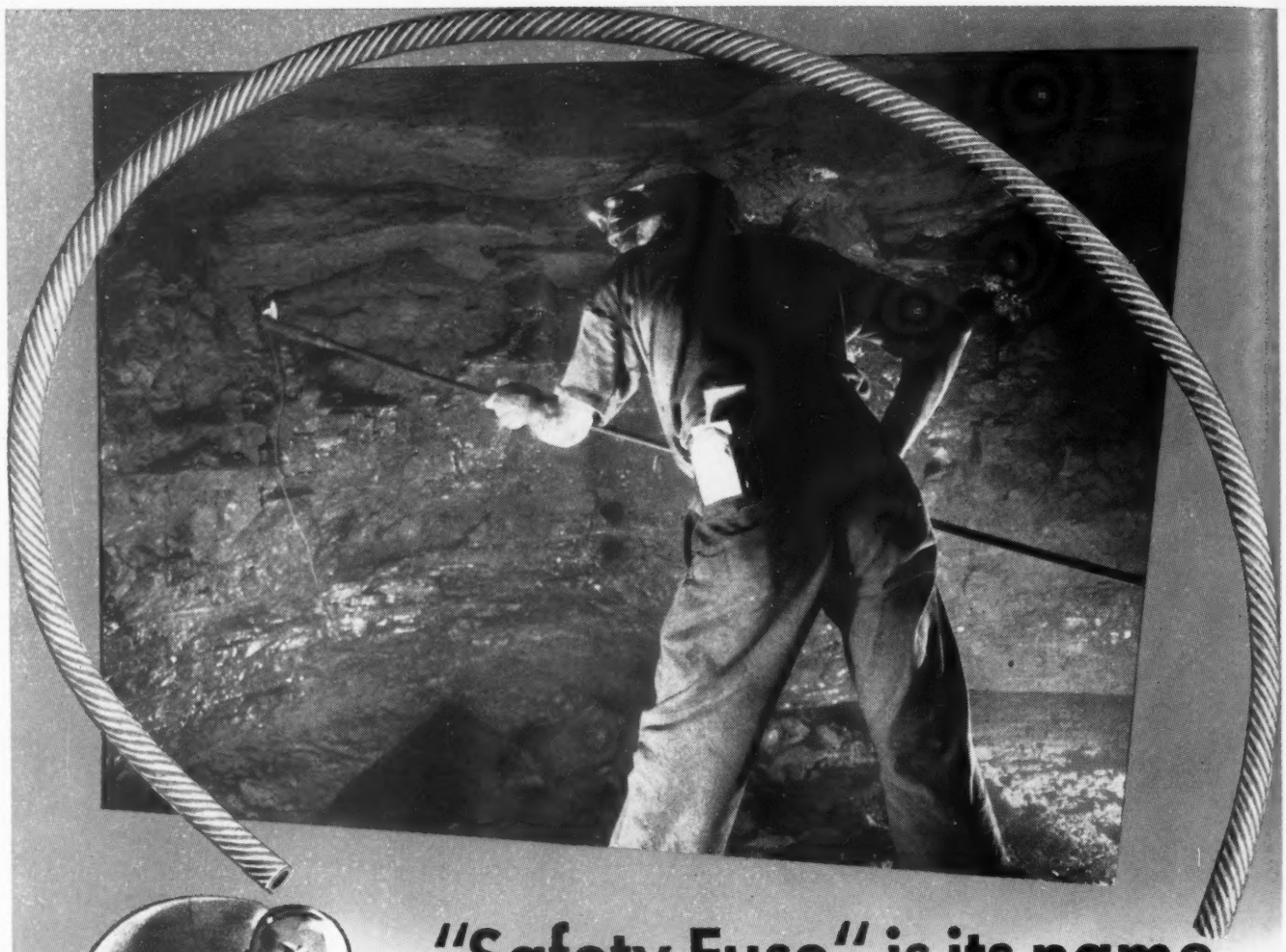
FRANKLIN, PENNA.



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Also Primacord-Bickford
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ENSIGN-BICKFORD
Safety Fuse

"Safety Fuse" is its name . . "Safety-in-Use" is its creed

Just as William Bickford first dreamed of the new miners' fuse which he later developed, leading to the founding of The Ensign-Bickford Company in 1836 — so the Ensign-Bickford engineers of this century dream of the day when the proper use of this highly-developed product will result in virtually complete elimination of mine accidents.

Their skill, experience and knowledge have put into your hands a safe fuse. Only you can keep it safe by using it correctly. A clean-cut fuse end, snugly seated in the cap and firmly crimped, centered in the primer cartridge and well-tied there, leaving enough Fuse for a walk to safety — these are the simple fundamentals.

For your own and for your fellow workers' protection — keep Safety Fuse safe by using it the right way. 5-17

THE ENSIGN-BICKFORD COMPANY • Simsbury, Connecticut

ENSIGN-BICKFORD *Safety Fuse*

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

AUGUST, 1945

After War—Peace

THE END of war and the coming of peace, still to happen but much nearer at the time of this writing, means the end of an unparalleled military effort by the American people. That effort is in part a measure of the thanksgiving that will mark its completion. But with the profound sense of relief at release from a burden of unequalled magnitude in history must come a quickening of the nation's consciousness of its responsibilities and obligations for keeping the peace and promoting the well being of the peoples of the United States and the world.

What is coal mining's share in the big task of the future? Lately engaged in an intensified effort to better fit himself for getting out the tonnage needed to finish the war—an effort marked by some measure of success—coal mining once again has shown its ability to take its share of the load. Carried forward into peace, that fighting spirit is further assurance of coal's determination to continue to render the service commensurate with its position as the No. 1 source of energy. In the trials of war, coal has gained new incentives and added experience which should lead to a quicker solution of its problems and distinct improvement in service to its customers and the nation.

Quality, low production cost and good earnings for employee remain the best economic policy any industry can have. Such a policy simplifies all problems of relations with employees, customers, the public at large and government. The answer coal has been working on is more mechanical equipment for mining, preparation and other operations, with safe, efficient methods to match. Coal should be in heavy demand for some time to come for relief and rehabilitation purposes as well as for meeting the pent-up demands for goods and services resulting from wartime restrictions. But need is not a valid substitute for low cost and quality and in the long run coal can strengthen its position only by offering consumers a better bargain through increased efficiency. Success means ability to continue to offer good employment at good wages while serving the nation better. Goals of 10 tons per man per day in bituminous and 5 tons per man per day in anthracite by 1950 therefore become even more worth striving for. With the new equipment that undoubtedly will be provided they should become more and more feasible.

Machine and methods, however, are not the complete answer to low cost, quality and earnings. Other important ingredients are management and manpower, their attitude toward their duties and their relations with each other. Both management and men have learned much more about working with each other in recent years and both have acquired a better idea of the important part they and their industry plays in providing energy for war and peace. But it also is fair to say that all the ramifications of real cooperation for the advancement of the industry and the benefit of those it serves are still to be fully explored. Conflict between employer and employee has been the major factor in coal's loss of standing with the public and in attempts at regulation and restriction through both state and federal legislation. Arriving at a better working relationship needs involve no loss of fundamental rights on either side while the advantages in increased efficiency and public regard are well worth a major effort by both management and men. Meanwhile, the undoubted benefits of the public-relations work already done are the best arguments for its continuation and expansion.

Maximum service to consumers with consequent strengthening of the industry's position also involves every possible effort to discover new and more efficient ways of using coal since nothing else, not even atomic power, is likely to challenge its position as the foremost source of energy for some time to come. The war, if nothing else, has shown that research pays off. In view of the advantages already gained, coal can well afford to expand its efforts to widen the use of its product and protect its position by raising efficiency in existing applications to the point where no consumer can afford to change. Coal's war contribution has been outstanding. Peace will not mean an end to its problems but there is every reason to believe that the solutions are not too difficult and that in arriving at them coal will capitalize in corresponding measure on the undoubted opportunities.

Can Coal Mining ANNUAL

Is guaranteeing annual wages the answer to the problem of better running time and more regular work in coal mining? If not, can anything be done to promote more regular operation? With Washington

By **IVAN A. GIVEN,** *Editor*
and **JAMES R. SUTPHEN,** *Assistant Editor,* **Coal Age**

WHEN President Roosevelt directed early this year that the Office of War Mobilization and Reconversion study the question of a "guaranteed annual wage," that question promptly passed from the stage of academic discussion to one of immediate industry and public concern—considering how Washington works. Arising in CIO demands and going through the National War Labor Board to the President, the study wound up in March in the hands of a subcommittee reporting to the War Mobilization and Reconversion advisory committee headed by O. Max Gardner, former southern governor and now Washington attorney.

Subcommittee members are: Eric Johnston, president, U. S. Chamber of Commerce; Philip Murray, president, CIO; Albert Goss, master, National Grange; and Mrs. Anna Rosenberg, of New York, regional director, War Manpower Commission. The subcommittee membership leads to the conclusion that it will be more inclined than not to indorse the guaranteed annual wage idea—at least in principle. A corollary conclusion is that industry—including coal mining—should be ready to present its case with authority and vigor at the proper time, which might be sooner than later, if it is to head off the possibility of burdensome and ill-advised regulations imposed from without and get a hearing for its own program.

At a quick glance, the idea of guaranteeing a minimum annual income has some attractive features for management as well as employees. But—and this is a big but—a slightly longer glance reveals difficulties of no mean stature, especially in coal mining.

Perhaps the way to start is with a double-barreled question: "What is the guaranteed annual wage and what would it be expected to accomplish?" The answer is not so simple, but perhaps one viewpoint can be arrived at by speculating as to how one of its advocates might testify at some future hearing:

Q. You have already stated your position, I believe, that minimum annual wage payments should be guaranteed to coal miners?

A. To coal miners—and to all other labor.

Q. What is your idea as to what the coal mining minimum should be?

A. The mine workers' contracts with the operators provide generally for a five-day week and two weeks' vacation per year. That is, each mine employee could work 250 days a year, assuming no overtime. Our people feel that in justice and equity that should be the basis of the guarantee.

Q. Yes. May I suggest that perhaps you have overlooked the fact that the average working time for coal miners is considerably less than 250 days per year, that—

A. That is as it may be, sir. The mine workers do not feel that they should relinquish a natural right to full employment because a management noted for its shortsightedness and callous disregard of its employees is unwilling to honor its obligations to society. We hold—

Q. Quite so, quite so. But do you not regard as significant the fact that coal mining is of necessity, due to the buying habits of coal users, a seasonal industry—that while full time might be possible in winter it is impossible in summer and therefore it would be impractical for the average mine to offer full working time?

A. I repeat, sir, that that is a problem for management and in no way reflects on the justice of the miners' claims. But if management is so

Guarantee WAGES?

studying the question for all industry, Coal Age analyzes the prospect in coal. Conclusions: guaranteeing wages is impractical; possibilities for greater regularization of working time merit further study.

barren of ideas, the mine workers might suggest storage in slack seasons.

Q. Can all coals be stored readily without risk of loss or deterioration?

A. In general, yes. The exceptions would be insignificant.

Q. Wouldn't this involve some increase in cost?

A. Perhaps. There is no reason to believe that it would be more than a negligible percentage, which would be far outweighed by the advantages. Since many coal companies already follow the practice of storing for their own advantage, they should not balk at storage to meet a just claim of their employees.

Q. Then it is your contention that 250 days should be guaranteed without exception?

A. Yes.

Q. Even for certain districts and certain mines accepted heretofore as highly seasonal?

A. Yes.

Q. Wouldn't this put them out of business?

A. Not necessarily. The number would not be important, even if it were conceded that they would have to close up, which we do not concede.

Q. But if storage was impossible, how could they continue to run?

A. That, I repeat, is a question management should solve, or if not, the State should take a hand. Some method would be found.

Q. Well, we'll go on. Now, to explore the matter of increased cost a little more, you are, I take it, willing to accept the prospect of a substantial reduction in number of mine workers if it were assumed that it would be possible, by storage or otherwise, for every mine to offer every man 250 days of work a year?

A. By no means—I mean, the mine workers positively do not agree with any such conclusion. On the contrary—

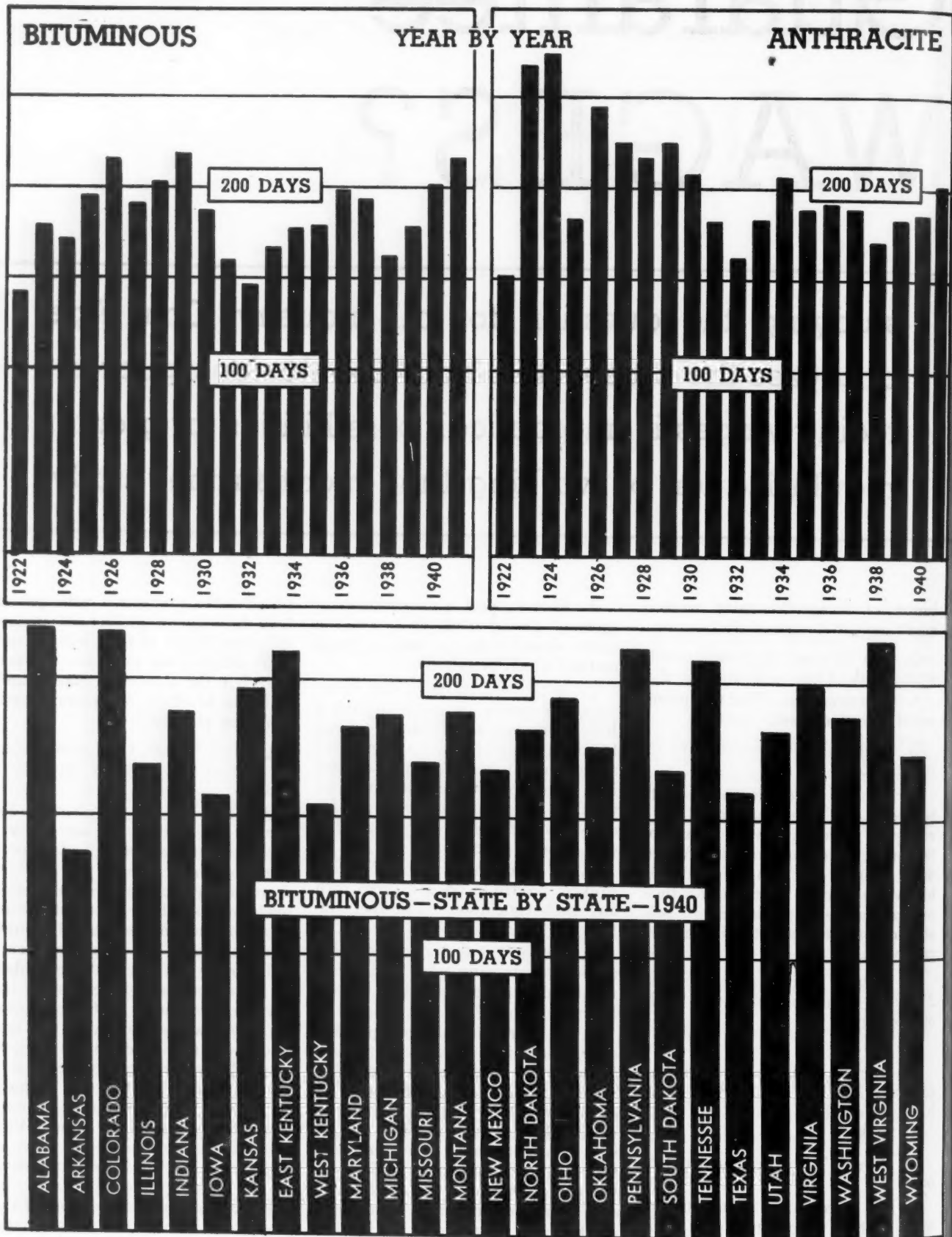
Q. But isn't it the only practicable method of keeping costs and prices within reason and preventing further losses of business?

A. Sir, I must make our position clear. The mine workers see no reason for wholesale discharges as a consideration in application of the principle of guaranteed earnings. The miner's work is hard, exhausting and fraught with constant danger from gas, coal dust and roof despite the efforts of our people to secure the adoption of even minimum safeguards by management more interested in swollen profits. The mine workers have long maintained that the work day should be shortened in any event and such shortening could and should be resorted to in connection with guaranteed earnings to protect all present mine employees in their jobs, as well as all other of our members who may have left the mines for good reason and want to return. We cannot recede from that position.

Q. Still, though, there would be an increase in cost—a pretty big one, in fact?

A. That sir, is the herring—the ancient red herring, if I may say so—the operators trot out to lend spurious color to their schemes for striking down every constructive suggestion made for the advancement of the industry by the mine workers. The mine workers cannot in good conscience suffer to go unchallenged the deliberate distortion and exaggeration of the effects of coal prices by the producers for their own selfish ends. The cost of coal is a negligible item in the cost of goods and services. But even if it were several times it would be justified in the results of assuring a more nearly living wage for the miner. With something approaching the value of his services and in some recompense for his standing by ready to work, he would be able to purchase more of the products of industry and consequently would play a bigger part in expanding our economy. Even the coal producer would find it difficult to avoid a profit accruing from lower cost through re-

How Running Time Varies by Years and by States



STUMBLING BLOCKS IN GUARANTEEING WAGES IN COAL MINING—Wide variations in running time from year to year, as well as from State to State, make guarantees virtually impossible without arbitrary action leading to substantial cost increases.

duced investment and more regular working time. The mine workers submit that the cost increases, if any, would not be controlling.

Q. But it is true, is it not, that, based on present wage rates and average running time, the extra cost of paying the present working force for 250 days per year would run over 50c. per ton for bituminous and over $1 per ton in anthracite—an increase of over $300,000,000 annually to consumers?

A. Sir, the mine workers do not propose to dignify the operators' figure juggling by entering into a discussion of them beyond rejecting it as being far removed from reality, as the operators well know. What we are concerned with here is a living wage for the miner—a wage that will buy food for the empty bellies of him and his loved ones, a coat for his back, a dress for his wife, shoes for his children. The miner is underpaid. All he asks is simple justice—his right to bread instead of a stone—

Q. Is it not correct that miners' earnings rank near the top in all industry?

A. I repeat, sir, that the mine workers are not interested in statistical sleight-of-hand. We maintain that the right to full employment outweighs selfish attempts to prevent our reaching our rightful goal. Justice—

Q. Thank you. That is all.

Time will show whether the preceding will be, in fact, some of the arguments for guaranteed wages in coal mining. But they might be. The question is, therefore, whether guaranteeing annual income is feasible under today's conditions. If not, is it possible to do something toward a greater regularization of employment in coal mining?

Guarantee and Alternatives

Analysis of the proposal that annual wages be guaranteed and study of the alternatives that might be employed to expand and regularize running time in coal mining lead to the following conclusions:

1. Guaranteeing any number of days' work or pay is impracticable in coal mining and any attempt to force such a guarantee on the industry would inevitably lead to higher costs and loss of consumers to other fuels.

2. Increased running time and greater regularity of work, however, have possibilities warranting additional study.

3. Storage, where practicable, is one possible method of increasing running time and regularizing employment.

4. Storage on the premises of the dealer or the consumer is the simplest and most attractive plan but would require intensified merchandising and, possibly, a change in merchandising philosophy.

5. Storage by the producer is a possibility and where practicable may provide advantages in more regular and continuous work equal to or more than the cost.

6. Pending the adoption of other measures that may be found economically feasible, maximum efficiency in production is the best assurance of full running time.

Guarantee Theory vs. Facts

In attempting to answer the question of the feasibility of guaranteeing mining wages, one might start with a look at the American scene—at least as it exists today. The United States still functions on the principles of free enterprise and individual initiative. Anybody with the desire and the capital can start mining coal. Consumers can buy coal or they can buy from a competitor. They can buy coal when they please and, within reasonable shipping limits, where they please. Above all, coal is a "dependent" industry, meaning that it produces only what the consumer demands, in only the quantities he needs and only when he wants it. Thus, it is subject to the variations taking place in business activity as well as to its long-term trends.

Coal also is used in 48 States of varying degrees of climate and industrialization. It occurs in a variety of types and grades. Consequently, there is great variation in the character of the demands on the mines and likewise in both total running time and running time in a particular season. The seasonal factor also necessitates keeping a sizable excess capacity which in itself prevents full running time unless it should be practicable to store.

For the 20 years ending with 1941, average number of days worked per year by the bituminous industry ranged from 142 to 219; anthracite, 151 to 274 days. When the experience of various producing regions also is examined, the problem becomes even more complicated. In 1940, for example, running time in the bituminous industry varied from 136 days in Arkansas to 219 days in Alabama. Arkansas was again low with 134 days in 1941, but West Virginia was high with 228 days. In view of these records, guaranteeing wages in a free and unregulated economy would pose many knotty questions.

What, for example, would be the basis of the guarantee—minimum running time in a certain period of years, average for the period or an arbitrary figure such as a certain percentage up to 100 percent of the theoretical year for the miner?

Would the guarantee be varied by regions and mines to prevent some from being wiped out because, as a result of market conditions, they would not be able to come up to an over-all standard?

If an average figure for running time was taken as the basis of the guarantee, could a reserve be set up sufficient to carry the industry through several bad years and would it be possible to set up a system whereby the miners would pay back in good times what the company advanced to them in depression years?

If it were decided to base the guarantee on running time above the average or, still higher, at the maximum time a miner could work under the terms of the contract, would storage be a feasible way of attempting to match running time and miner working time and what would happen to the miners that would then be unnecessary?

If it were decided to take the other tack and pay the present number of employees for 250 or some other number of days, whether they worked or not, how could coal be protected

against loss of business to other fuels and consequent aggravation of its problem as a result of the heavy price increases that would be necessary?

The preceding questions bring out only a few of the tough problems that would follow an attempt to guarantee earnings, especially on an annual basis in excess of those possible in the average working year. It all boils down to the fact that guaranteeing earnings does not automatically guarantee the sales of coal which must be the source of the money to back up the guarantee—unless the consumer or the public in general is taxed directly or indirectly (through higher prices) to make up the difference. Storage might provide an approach to the problem but it definitely is not a cure-all.

In a free economy, therefore, the conclusion must be that guaranteeing wages in coal mining is a task so difficult as to be well-nigh impossible if the industry is to be protected against heavy losses and the consumer against substantial price increases. If, as an alternative, an attempt were made to set aside the law of supply and demand, it needs no more than a second-grade crystal ball to discover immediately that the only answer would be regimentation to the hilt to make demand match a set supply.

The Running-Time Problem

The conclusion that guaranteeing wages in coal mining is so difficult as to be impractical leads to a second conclusion, that the best answer to the question of maximum working time and earnings is efficient, low-cost production and high quality. That, however, does not mean that increasing the annual running time in coal mining by any other feasible methods is not highly desirable, provided the goals are reduced cost and better service to the consumer. On that basis, many producers see an opportunity for a real contribution to the progress of the industry.

If increasing running time were economically feasible, the advantages would include:

1. A more stable and contented working force. It would have to be recognized that raising the level of running time would enable the industry to mine the same tonnage with fewer men. These men, however, would be relieved of the feeling of insecurity in their jobs which was cited as a major cause of discontent by Whiting Williams in "What 25 Years Have Meant in Coal-Mine Thinking" (November, 1944, *Coal Age*). Their income, in addition to being greater, would be less subject to seasonal fluctuations—another factor contributing to stability and contentment.

2. A more efficient labor force. A stable, contented worker is a more efficient worker. Beyond that, more continuous production means work teams or crews that stay together, are steadier and always available for work, and which do not require the training and breaking-in necessitated by a constant influx of new employees.

3. A reduced investment in producing facilities and lower idle-time costs. If an increase in running time per year would permit cutting the number of loading units and territories from five to four, as an example, with accompanying cuts in other producing and preparation facilities and in idle-time charges, some cost reduction naturally could be expected, although it would be offset in part by any investment in facilities and labor for storage, if adopted. In the case of a going property already equipped, it also would be true that the entire reduction could not be achieved immediately because the investment would have been made and would have to be retired. Some benefit from the elimination of true idle-day charges could be expected, however.

4. Management could function more efficiently. All businesses operate better when they have reasonable assurance of fairly steady running time. Given a more constant production through increased working time, operations could be forecast more accurately and men and machines better geared to the job.

5. Industry standing would be enhanced. Steadier work would cut much of the ground from under critics of the industry and would rob axe-grinders and coal baiters of much of their excuse for attacks, investigations and other harassments.

While these and other advantages undoubtedly are attractive, it should not be inferred that they are all clear gains. If, as previously noted, storage was necessary or other costs were incurred to permit increased running time, these would operate to offset, at least in part, the gains in other directions. The problem therefore resolves itself down to possible costs of expanding and regularizing working time in relation to the benefits to the miner, producer and consumer.

Initiation of a study of means of increasing running time quickly brings the investigator to two considerations:

1. Production practice.
2. Consumer buying habits.

Both are reflected in the producing capacity of the industry and consequently in running time. Discussion of Point 1 recalls certain stabilization suggestions that have been and are actively advocated by a number of producers. While in agreement as to the goal, these producers approach it from perhaps two directions. One group bases its case on attaining maximum efficiency in operation. With low cost and highest possible quality, plus a good sales organization, these operators see the stage as set for maximum running time. There is much to be said for this method, although if the industry should again be subjected to regulation, the low-cost properties would lose some of their advantage.

Perhaps influenced by the thought of compulsory minimums, the second group of operators would proceed on the basis of a realistic appraisal of sales possibilities. In essence, they base their case on a hard-boiled analysis of how much they could be expected to move in a year at a reasonable profit, then gearing producing equipment and labor force to that bogey. This simple statement does not, of course, mean that proceeding under the plan is equally simple. Its advocates state, with justification, that it is a step in the right direction and also that it is helped mightily by low cost and high quality.

Sales Work and Results

All agree that good sales work is a big factor in the final results. Where price and quality are nearly equal, sales and service mean the difference between getting and not getting the order.

Evening out the production rate naturally reflects the extent to which buying is evened out and some hold that here is an opportunity for real salesmanship. Because a substantial tonnage of coal is used seasonally, evening out buying and consequently production necessarily involves storage somewhere along the line, provided the coal will store. Since coal, in contrast to liver pills, soap or shoes, is, among other things, bulky, storage is somewhat of a problem. Among the questions is "Where?" One answer is the basements of domestic users. If this sizable storage space, plus the space in dealers' yards and elsewhere, could be used, a long step toward evening out running time and employment could be made.

The difficulty is consumer buying

habits. Assuming that the coal will store, some inducement must be offered the consumer to persuade him to take his coal during the non-heating season. The customary one is a price cut, which may be combined with a deferred-payment plan. If it is to be feasible, the cost to the producer must be less or at least no more than the resultant savings. Also, there is the problem of whether feasible concessions are sufficient to really interest the consumer, or if they can be made to do so by good salesmanship.

Some producers see a more likely answer in some of the newer merchandising philosophies, such as the sale of a fuel or heating service rather than just coal. If the user were to accept a heating service contract providing for regular payments over all or part of the year, its advocates argue that it would make little difference to him when his fuel was delivered. Consequently, there would be a better opportunity to deliver in the summer and thus make possible more regular running time.

Can the Producer Store?

Assuming that storage by the user could not be worked out, the next question is the practicability of storage by the producer. It involves several subsidiary questions, including:

1. Will the coal store?
2. Where can it be stored?
3. Will the cost offset the savings in other directions?

Some coals store well with little degradation and a minimum of firing or none at all. Others are progressively more difficult until some are reached, notably the lignites, that cannot be stored at all in the usual sense.

Storage space is a big problem for many operators in thickly settled areas or in hilly or mountainous areas. Assuming it was piled 15 ft. deep, 50,000 tons of bituminous coal would require approximately 150,000 sq.ft. of space, or an area almost 400 ft. on a side if it were square. Furthermore, it would have to be easily accessible, either by truck, rail or conveyor. Finding a location, therefore, would be a real problem for many mines, with storage on an in-transit rate at some distant point as about the only alternative.

Degradation a Factor

Aside from the cost of handling and a site, the major problems in coal storage are degradation, slacking, firing and loss of heat content. Coals that slack badly upon exposure to the air manifestly do not lend themselves to storage and thus there is less opportunity for using this method of increasing and regularizing running time. Where moderate or severe slacking is not a problem, degradation is, although its severity varies with the type of coal.

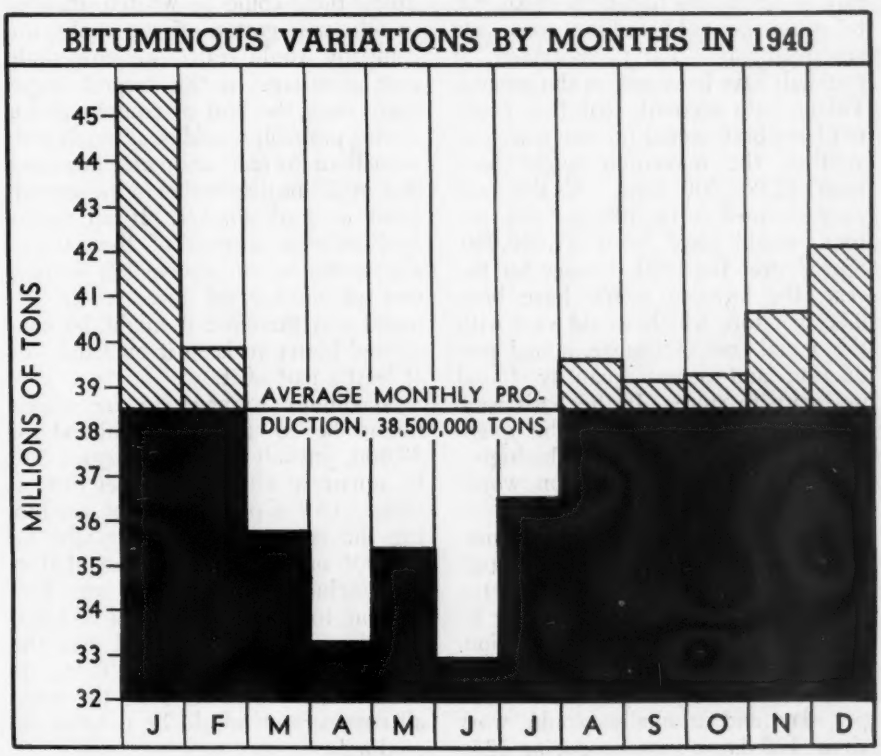
A cargo of 1¼x3-in. Pocahontas stove shipped and stored at the Lake docks is reported to have wound up as follows: stove, 43 percent; nut, 13 percent; pea, 16 percent; screenings, 28 percent. A cargo of egg ended in 36 percent egg, 18 percent stove, 10 percent nut, 10 percent pea and 26 percent screenings. A cargo of nut came out as 54 percent nut, 16 percent pea and 30 percent screenings. Coals such as these admittedly are subject to more severe degradation in normal handling direct from the mine to the retailer or consumer, but when supplementary rehandling is required, as in storing, the additional loss in value through size reduction is substantial.

Storage as screenings reduces the degradation problem but it would be difficult to avoid putting down at least some large coal, especially if government prices forbade reductions to move slow sizes at certain seasons. Loss of coal in the ground in the first year or two is an expensive item unless costly concrete or other foundations are constructed.

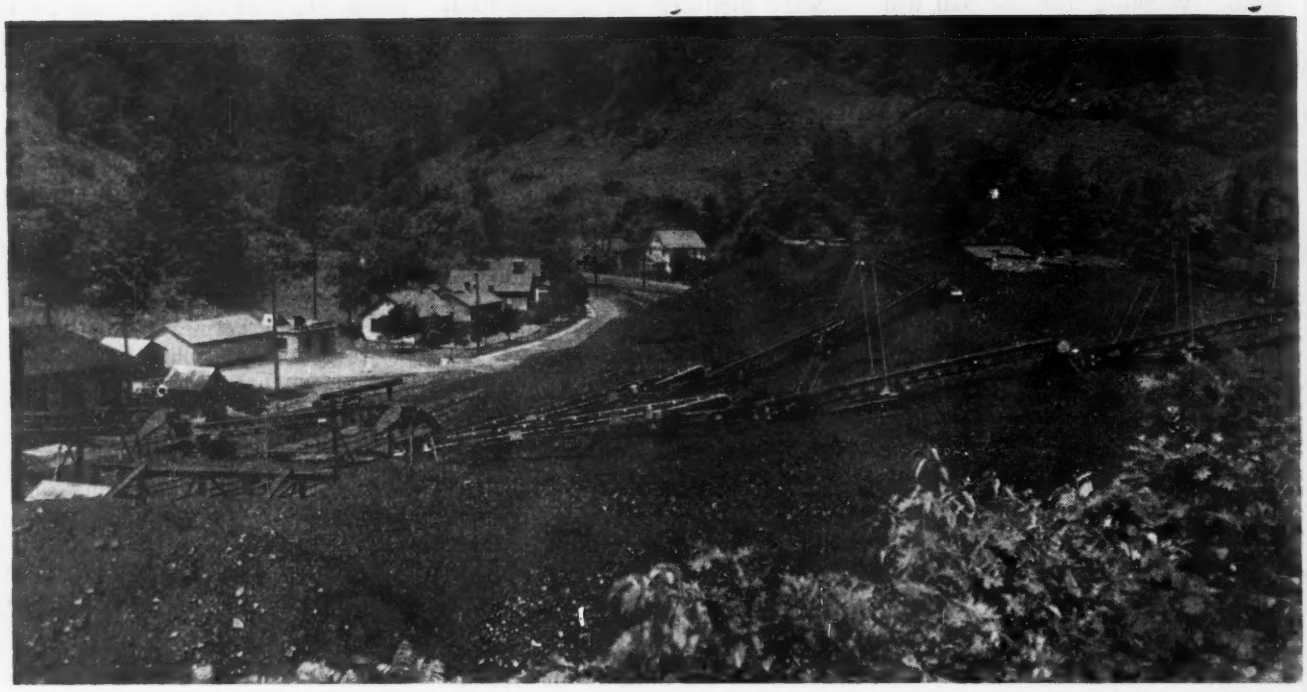
Oxidation in storage, on the basis of experimental information, can reduce heat content as much as 500 B.t.u. per pound. There is a compensating factor of sorts, however, in that coal gains slightly in weight. Guarding against spontaneous combustion also increases cost through extra expense in piling to reduce the hazard or special provisions for keeping track of temperatures and for cooling hot spots.

With all these considerations, it is apparent that storage costs money and has about it some element of risk. Yet it is done on a considerable scale by some classes of consumers and some producers. Some utilities and operators state that storage cost is not over 10c. per ton, not including degradation and the repreparation that usually would be necessary if the producer did the job. Taking these things into consideration, opinion that the over-all cost would be 25 to 50c. or more per ton seems more likely to be correct.

Another question in connection with storage is: "How much?" A typical year is hard to pick, but a study of 1940, a pre-war and pre-defense year, might throw some light on the problem, although the total tonnage is under that which is expected in post-war years. Bituminous output in 1940 was 460,772,000 tons. If it had been



A JOB FOR STORAGE?—Seasonal variations in demand produced this monthly tonnage picture in 1940. If production had been completely regularized, 18,000,000 tons would have had to be stored.



Installed to increase working time in an otherwise slack season, this storage set-up has a capacity of 150,000 tons. Coal is piled to a height of 50 ft. in an area within 500 ft. of the preparation plant.

spread evenly, the production rate would have been 38,400,000 tons monthly. Actually, output varied from 45,709,000 tons in January to 32,940,000 tons in June.

If production were considered as equivalent to demand, which it approximates, it would have been necessary, if operations had been equalized, to store about 18 million tons (see accompanying chart), provided it could all have been put on the ground. Taking into account coal that could not have been stored for one reason or another, the maximum might have been 12,000,000 tons. If the cost were assumed to be 30c. per ton, the total would have been $3,600,000. Spread over the total tonnage for the year, the increase would have been 0.8c. per ton, which would vary with the actual cost of storage, actual production and actual quantity found necessary to store. If the basis were a higher annual demand, the quantity stored necessarily would be higher but the over-all cost per ton would be approximately the same.

Industry-wide storage, at first glance, appears not unduly difficult although it does have its problems. To get a little closer to cases, storage might be related to an individual operation. This operation, it might be assumed, would have a capacity of 1,500 tons per day and normally would work about 170 days a year, producing 225,000 tons. To get 1,500 tons per day, one shift, it might operate six loading units. The coal, it also might be assumed, would store fairly well.

If it were the plan to run 250 days a year by storing, assuming that the market for the mine would not take more than 225,000 tons, average daily output would need to be only 1,000 tons. Two loading units could be cut off and other facilities could be reduced in proportion. However, unless these could be written off, sold or otherwise gotten off the books, the company would realize no immediate cost advantage in this respect, especially since the cost of equipment for storing probably would be as much as or more than the realization on equipment that might be disposed of in the second-hand or junk market. If all excess facilities were disposed of, there naturally would be no reserve left to take care of unexpected increases in demand and therefore it might be considered better to keep it on hand—or at least a part of it.

Maximum tonnage to be stored might be in the neighborhood of 30,000, possibly requiring a space 300 ft. square or equivalent other dimensions. Out-of-pocket cost of producing the coal to be stored might be $36,000 or more. If the cost of storing, including all charges, was 50c. per ton, total outlay would be $15,000 and the cost per ton spread over the annual output would be 6.7c. If the storage cost were less, the over-all cost per ton would be reduced accordingly.

The question then becomes: "Can this extra cost be offset by economies elsewhere?" Reduction in investment for producing facilities offers some possibility but only to the extent that it is not offset by the cost of storage equipment and site. Some idle-day charges could be reduced or eliminated but with the same annual tonnage and continuous operation of pumps and fans, power and labor for these and similar operations might remain the same or would be reduced only slightly.

Other opportunities also would be present but the major saving would have to come out of higher efficiency through more regular operation plus economies resulting from concentration. What this saving would add up to, of course, is dependent upon a variety of factors but it is an accepted fact that regular work and concentration do cut cost—sometimes substantially. In some cases, it is contended, the savings might be several times the cost of storage.

In storing, of course, the operator runs the chance of diving into a depression and being stuck with a choice of holding on to the coal indefinitely or taking a possible penalty in working time. For this reason, if no other, storage is not a sound basis for guaranteeing annual wages and should not be so employed. Also, storage is no universal panacea. Rather, it can serve only as an adjunct, where it can be employed, to other methods for regularizing and increasing running time. Until other measures are proved to be practicable and economically feasible, the best guarantee of maximum running time remains maximum efficiency in production, thereby assuring low cost and more business.

Mechanical mining and belt transportation make for high efficiency at Bolair mine. Here, one of the larger of two types of crawler loaders is being served by a cable-reel shuttle car.

SHUTTLE CARS AND BELTS

Increase Loader Efficiency at Bolair Mine

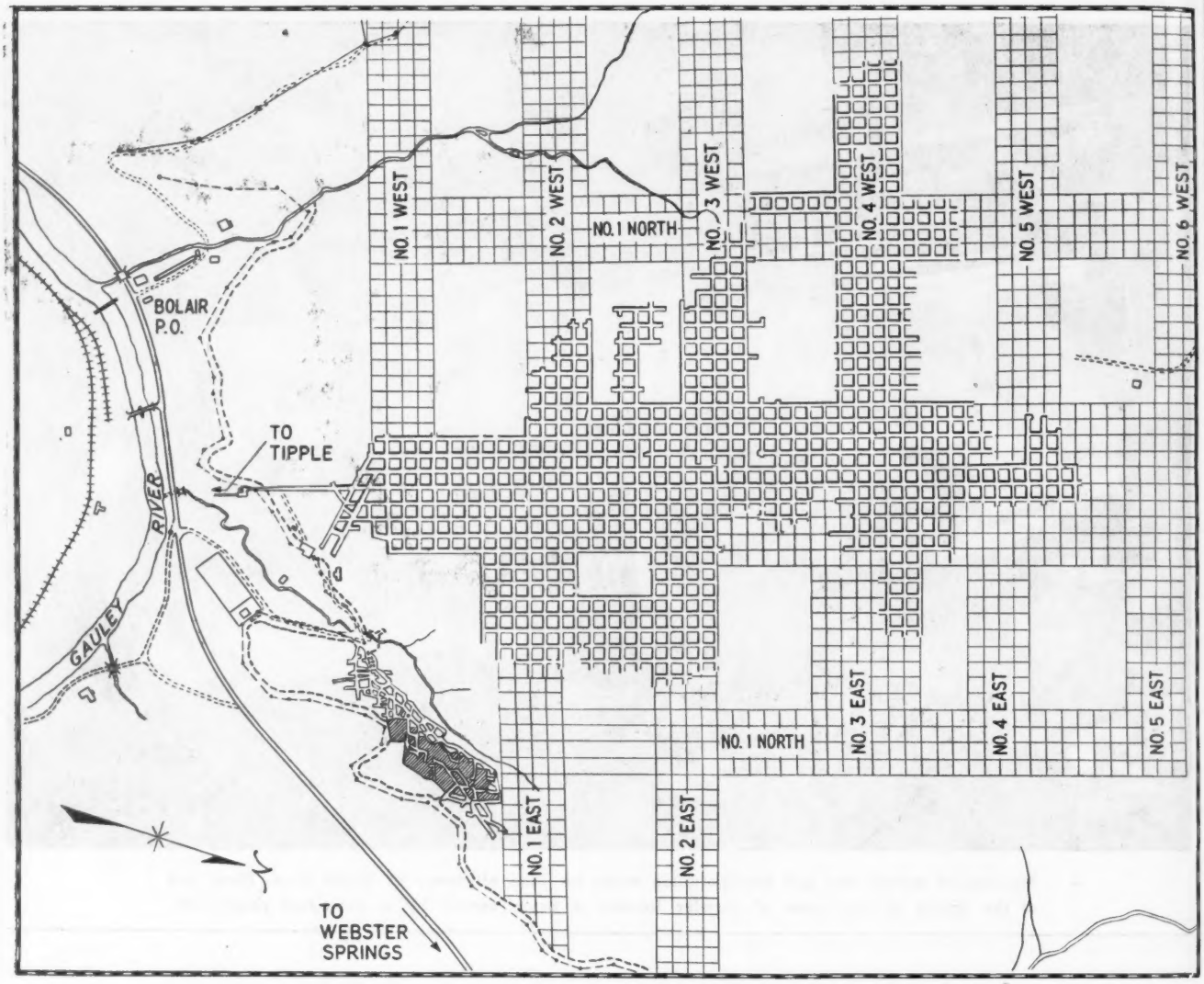
Thick-Coal Find Converts War Property to Large-Tonnage Long-Term Operation — Three Loaders With Shuttle Cars and Belts Mine 1,700 Tons in Two Shifts per Day — Heavy Grades Successfully Surmounted

By J. H. EDWARDS
Associate Editor, Coal Age

MILLIONS OF TONS of thick coal instead of a half-million-ton pocket was a surprise culmination of the opening of the Bolair mine in the fickle Fire Creek seam in Webster County, West Virginia, in 1943 to augment wartime coal supply. The mine was planned by the Pardee & Curtin Lumber Co. for an output of 600 tons per day. It is now producing 1,700 tons. A main-haulage belt was installed in December, 1943, and in 1944 it delivered 317,563 tons to the tipple.

Large increases in production and efficiency won the mine both Coal Age "Coal-for-Victory" awards for 1944. Crawler-type loaders, rubber-tired shuttle cars, chain conveyors and belts comprise the loading and transportation equipment. The mobile loaders have been used on grades up to 30 percent and the shuttle cars up to 20 percent. A superior face preparation for mechanical loading is obtained by shooting bottom holes with carbon dioxide and top holes with permissible explosive.

The mine is at Bolair, on Gauley River, five miles from Webster Springs on Highway No. 20. From the portal the belt line crosses the highway and Gauley River to the tipple, which is on the Baltimore & Ohio R.R. Five feet of coal showing in an old wagon mine near Bolair led the owners of the land and minerals, Pardee & Curtin



Development at Bolair mine up to Dec. 15, 1944. All blocks, or pillars, are 56 x 56 ft. Ten headings constitute the straight or main entry and five constitute the cross-entries.

Lumber Co., to make core drillings in that vicinity to the limiting depth of their 350-ft. outfit. Other data from crop prospect holes had indicated that in that locality the Fire Creek seam would be found to run as thin as 12 in. The semicircular pattern of core drill-holes showed 12 in. to 8½ ft. of coal and from that pattern it was estimated that the 8-ft. area contained 500,000 tons. But as the development of the mine on that basis proceeded it was found that the area of 8-ft. coal fanned out to increasing width. It is a low-volatile high-fusion coal moving principally to the byproduct and steam markets, but also used for domestic heating.

The Pardee & Curtin Lumber Co., of which G. D. Curtin is president, E. F. Curtin general manager, and F. K. Day general superintendent, mined in 1944 from five operations 1,500,000 tons of coal. Four of the mines, including Bolair, are in Webster County. The other is in Harrison County. Of the four in Webster three are in the Sewell seam. Bolair mine represents the first experience of the company in mining the Fire Creek. C. W. Thompson is superintendent of this new mine and also superintendent of Bergoo No. 2, on the other side of Webster Springs, K. D. Albaugh is general mine foreman at Bolair.

Storage Bin Receives Coal

The mine belt delivers to a 200-ton hillside storage bin at the bottom of which are a bar screen, picking table and crusher (Jeffrey, 24x36-in., double-roll). In this crusher the picked lump is broken to 4 in. before being carried on a belt across the highway and river. There, in the tipple, which is a wooden two-track structure with shaker screen, additional picking is done on the loading boom. Much of the outside handling equipment will be rebuilt soon to accommodate the expanded long-life plans for the mine.

The following list of principal underground equipment indicates something of the mining methods and extent of development: five 30-in. Jeffrey belt conveyors in lengths of 1,500, 1,379, 1,240 and 1,200 ft. (two); seven Jeffrey 61W chain conveyors used as links between shuttle-car dumps and belts; three Jeffrey 35B shortwall cutters with 8-ft. bars (with Marathon double-pointed bits); one Goodman 312 shortwall; three Joy crawler-type mining-machine trucks; four Jeffrey A7 electric coal drills; two Joy 12BU loaders; one Joy 14BU loader; and six 3-ton shuttle cars with cable-reel drives.

Being very soft, the coal is easy to drill and cut. The mine bottom is hard and the top firm. Local grades are numerous and the seam as a whole dips approximately 6 percent away from the outcrop through which the

mine was developed. Some water is entering the mine from the coal, roof and bottom, and for that reason no pillar drawing will be attempted until a retreat is begun from the back end of the mine. Advance workings are now under approximately 650 ft. of cover and the ultimate may approximate 750 ft.

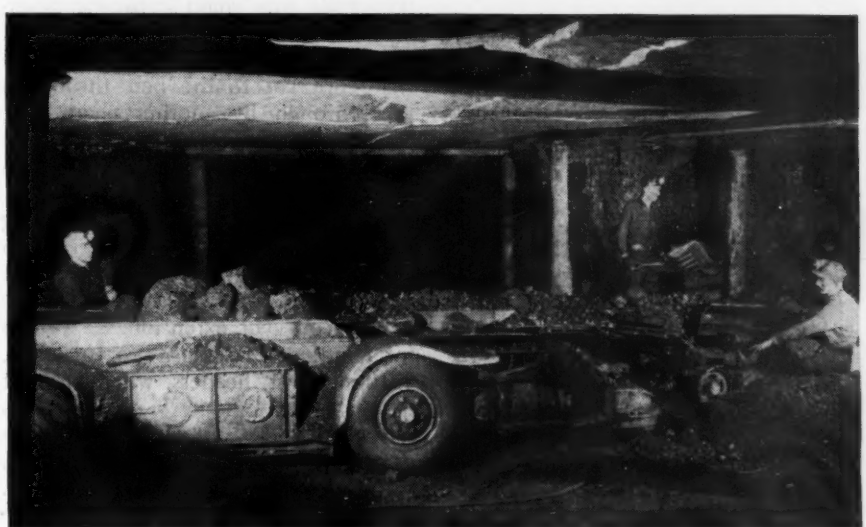
Brattice Lines Carry Air

In development, all working places (mains, cross-entries and breakthroughs) are driven 16 ft. wide and the blocks are 56x56 ft. The maximum distance from fresh air is never over 72 ft. No auxiliary blowers are used. Line brattices are erected instead. Permanent stoppings are 8 in. thick and are built of hollow tile plastered on one side. Temporary ones are of wood, also plastered on one side.

All belts have reversible controls and up to April 1 they were used for delivery of all materials into the mine and for the men to ride out on. Recently, a 35-lb. material track and a 6-ton Jeffrey trolley locomotive were installed for carrying materials along the main entries. Men walk into the mine but will continue to ride out on the belts. Even the main belt will be reversed at certain times—to take underground the 1,000-ft. sections of belting which, to reduce the number of splices, is the standard length for making conveyor extensions.

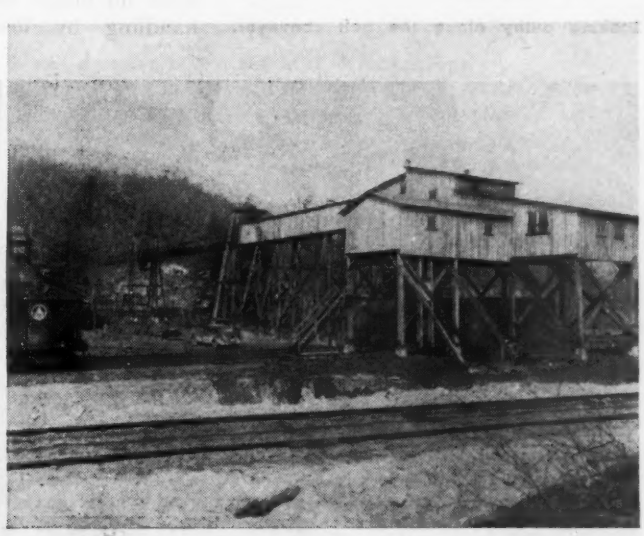
To limit shuttle-car hauls to 250 ft. and at the same time keep the belt entries clear for making 850-ft. extensions of belt conveyors, the shuttle cars dump to a chain conveyor on a heading parallel to and adjacent to the belt heading. As driving of the entry

The 30-in. belt conveyor is carried across the State highway and Gauley River on rope suspensions.



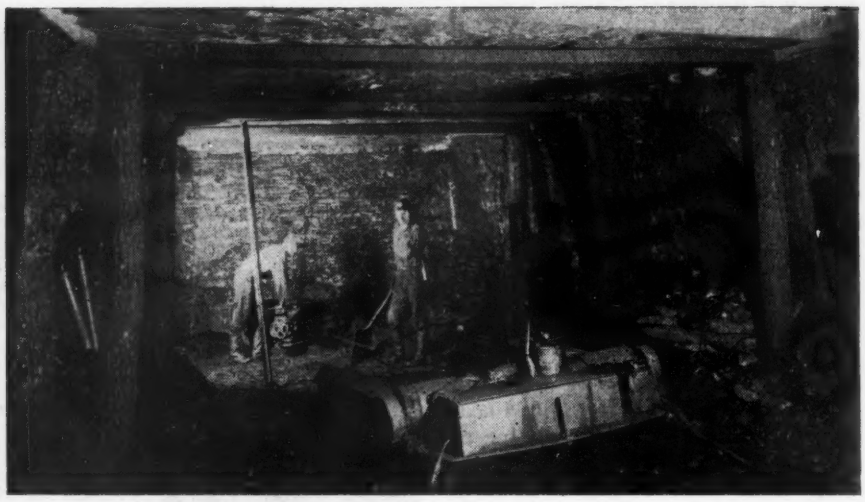
In No. 3 heading, 1 North off 4 West, a smaller machine loads into a cable-reel shuttle car.

The mine belt discharges into a 200-ton bin, where the coal is picked and crushed before traveling on a belt to the tipple. This hillside installation will be rebuilt.



This tipple, planned for 600 tons per day, will be rebuilt, along with the bin and picking and crushing house with storage bins on the hillside across the river.

The crawler-type loader could not climb this 30-percent grade until a wooden ladder with cleats was built.



Cutting No. 5 heading 4 West. The machine is transported on a crawler truck

Looking outby along the belt conveyor.

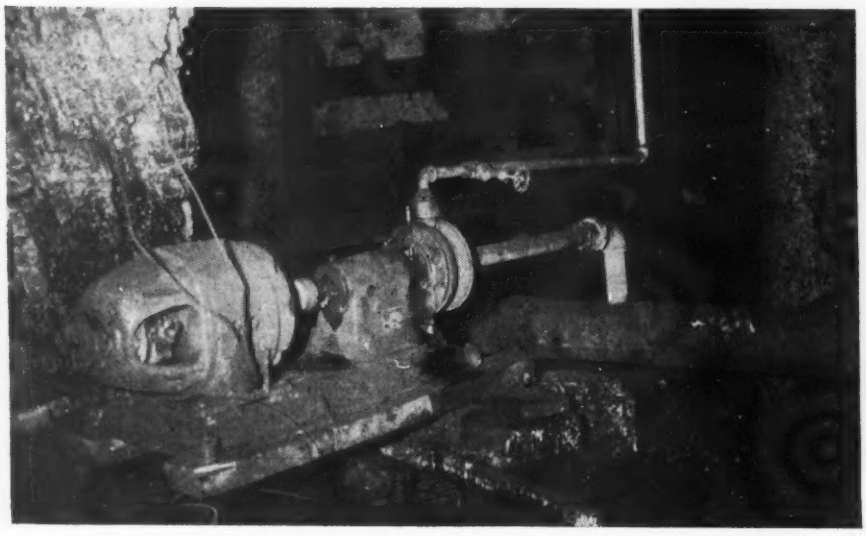
progresses this chain conveyor is extended until it reaches 600 ft. ahead of the belt. The coal is carried from that conveyor to the belt through a breakthrough by another chain unit 72 ft. long.

Shuttle cars dump to the end and also to the side of the chain conveyor. Among the reasons for not dumping shuttle cars to the belt, especially to the end, is the desire to keep the belt heading clear and ready for making the 850-ft. conveyor extension, as well as for handling materials. For instance, 3x10-in.x16-ft. headers, when brought in on the belt, practically unload themselves onto the mine bottom in the clear space beyond the end of the belt. Limiting shuttle-car hauls to 250 ft. saves much time, especially where grades are severe.

In face preparation for the mechanical loaders emphasis is placed on shooting to break down all of the coal and leave no lumps too large for efficient handling by loaders, shuttle cars, chains and belts. Bottom holes are shot with Cardox, which rolls the coal out farther than permissible explosive. The three top holes are shot with Liberty No. 9 Monobel, which leaves fewer and smaller lumps than would Cardox. The Cardox holes are drilled 3 ft. from the bottom while the powder holes are drilled close to the top. The charge in each top hole consists of four 1¼x8-in. sticks.

Where shuttle cars have hauled on grades of 20 percent a rope hoist has been used to assist them. On a 30-percent grade the loading-machine crawlers slipped. To overcome that a wooden "ladder" with cleats was placed on the bottom as a track for the loader to grip and climb. Three loading machines working two shifts produce 1,700 tons per day.

All belt conveyors are designated by numerals at Bolair. No. 1 is a 1,500-ft. section with its drive motor on the outside. No. 2 is on the straight entry, is 1,379 ft. long and delivers



Boosting the water pressure for the fog nozzle.

Fog nozzle allaying dust at belt transfer.

Looking outby at the end of the belt on 4 West. Rails are used as anchoring jacks. Crossbar planks, 3 x 10 in. x 16 ft., lie where they landed when carried in on the belt.

Cable-reel shuttle car dumping to the side of a chain conveyor which in turn delivers to a belt.

Shuttle car dumping to the end of a chain conveyor.

72-ft. chain-type cross conveyor discharging to the belt on 4 West.

to No. 1; No. 3, 1,240 ft., delivers to No. 2 from the west section of the mine; No. 4, 1,200 ft., is on the same west section but inby of No. 3. A No. 5 belt, 1,200 ft. long, will be installed soon on First North off 4 West.

No. 1 belt is driven by a 60-hp. 440-volt wound-rotor motor with General Electric three-speed and reversing contactor controller. Other drives are 30- and 40-hp. motors with Ohio Brass Type AD or BD starters. The 30-in. belting used throughout is Goodyear Style MX.

Conveyors Accurately Aligned

Belt conveyors are so accurately aligned that no guiding idlers are required. In surveys prior to installation, alignment spads are placed in the roof every 72 ft. From the surveyed roof and bottom elevations at these points the preferred profile is worked out in the engineering office and the elevations for this profile are then marked on the roof at each spad. Men installing the conveyor pans need only to measure the recorded distance to place the pans at the correct elevations. Along all stretches where pans are off the bottom they are supported on, and attached to, cross members spiked to posts. Belt idlers are greased every 60 days and records are kept of the dates of these greasings.

All sections of the belt line are termed "main belts" except the last belts inby; that is, except the belts onto which chain conveyors discharge. These inby or secondary belts operate at 200 f.p.m. and the main belts at 375 f.p.m.

At the end of the shift the men ride the belts all the way out except that they naturally must dismount and walk around the transfer points. Above some of the belts the roof clearance is such that the men can ride standing full height. On sections No. 2 and No. 1 on the straight entry they must kneel. Minimum

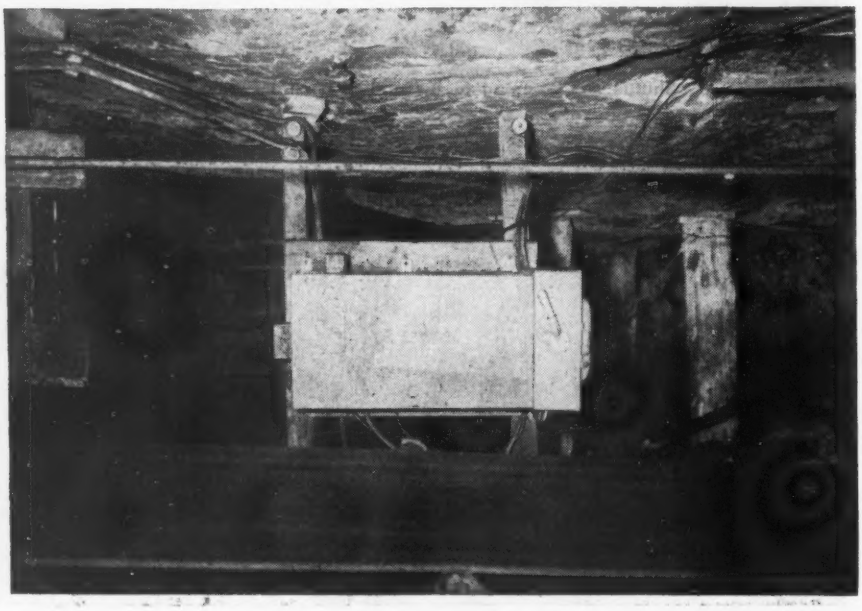
No. 3 belt on 4 West discharging to No. 2 belt on the straight.

Discharge of Belt No. 2 to Belt No. 1 to the outside.

View outby along No. 1 belt, which delivers to the bin on the outside. It is installed on cross timbers to conform exactly with a profile drawn up by the engineers.

clearance from belting to roof or crossbars is 24 in. When belts are elevated a foot or more from the floor at transfer points, wood platforms 20 in. wide and 16 ft. long are erected alongside to make it easy for men to get on and off while the belt is in motion.

A 120,000-gal. sump has been built at No. 3 West for mine drainage. To date the water shows no acid tendencies sufficient to cause rapid corrosion of steel. At this sump there is being installed a new Dayton-Dowd 500-g.p.m. 2-stage 300-ft.-head centrifugal pump with 60-hp. General Electric 275-volt motor. The pump will be "submerged"—that is, it will be at a lower level than the bottom of the sump. Through a Mercoid pressure switch connected to the sump, the pump will start automatically between 2:00 a.m. and 7:00 a.m., as indicated by a time clock connected in the control circuit.



Looking across the belt at an automatic starter and reversing switch (attached on the end of the starter) which controls the d.c. drive motor of Belt No. 2.

Upon start, if the water does not reach a designated point in the discharge line in 45 seconds, the pump will stop and a warning is sounded at a central point near the belt on the straight entry. Whenever the pump stops a Thrustor-operated valve will drain the discharge line. This prevents reversal of the motor and freezing of the 6-in. discharge line at the portal. When the basin or lowest point of the mine is reached a borehole will be drilled and a deepwell turbine pump will be installed on the surface.

Fire Line Installed

Connected to the sump is a 2-in. line which provides water by gravity to places in the sections which lie at lower elevations for fire fighting and sprinkling. On the 2-in. line along belts a take-off connection and valve are provided every 150 ft. A 75-ft. length of hose can be installed at these connections.

Coal dust is allayed by a mist or fog of water at belt transfer points. For this purpose the pressure is boosted by a Rayton-Dowd centrifugal unit driven by a 2-hp. 1,750-r.p.m. Westinghouse d.c. motor. The unit has sufficient capacity to supply eight fog nozzles. To prevent clogging of the nozzles a Leslie self-cleaning Y-shaped strainer is installed close to the pump in the discharge line. Opening a valve to a drain connection allows the water standing in the fog nozzle line to flow back and wash the screen. A Marlow rubber-tired pump is installed for dewatering wet spots.

Rock-dusting is done with an M.S.A. portable unit which is moved manually, dragged by self-propelled equipment such as a shuttle car, carried on the belt or in a shuttle car.

Each mining section is equipped with a first-aid station. The supplies are kept in a locked steel box in a

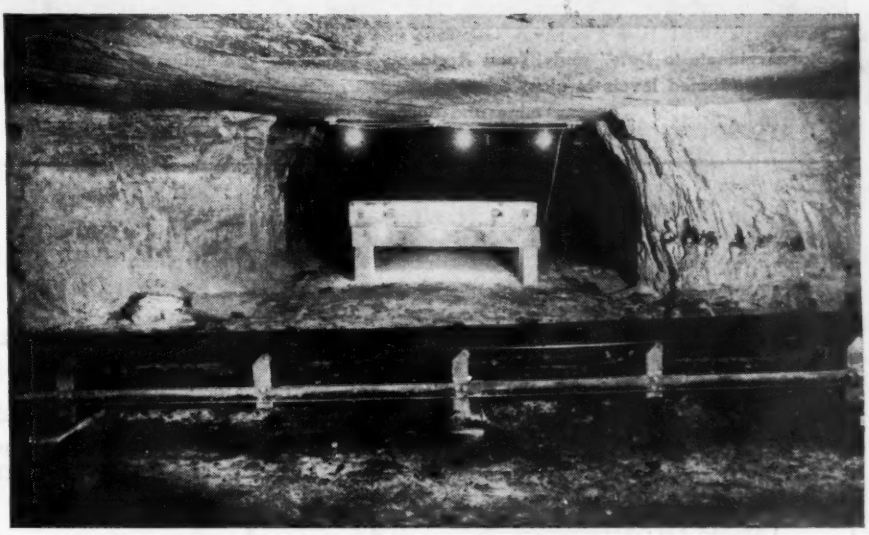
Oilhouse, fan (center background), transformer substation and building housing the shop and lamp and supply room.

Permanent stoppings are built of tile plastered on one side.

breakthrough adjacent to the belt. The box is on a wooden bench 30 in. from the floor with three lamps above for illumination and four below to keep the box warm and dry. Inside the the following first-aid items: one new-type M.S.A. stretcher, two woolen blankets, one rubber blanket, one Foille burn-treatment kit and one 36-unit M.S.A. first-aid kit.

Power for the mine is purchased and d.c. is supplied by two 200-kw. motor-generator sets in an outside substation. That arrangement was to be augmented in May by a new portable rectifier installed underground (General Electric 300-kw. sealed-tube unit).

A temporary fan now in use will be replaced about September of this year with a Jeffrey 60-in. Type 8H Aerodyne unit capable of circulating 120,000 c.f.m. at a 9-in. water gage. Its drive



Across No. 3 belt on 4 West is a first-aid station maintained in a heated steel box.

This portable rock-duster is driven by a 2-hp. d.c. motor.

Wet spots are dewatered with this rubber-tired pump.

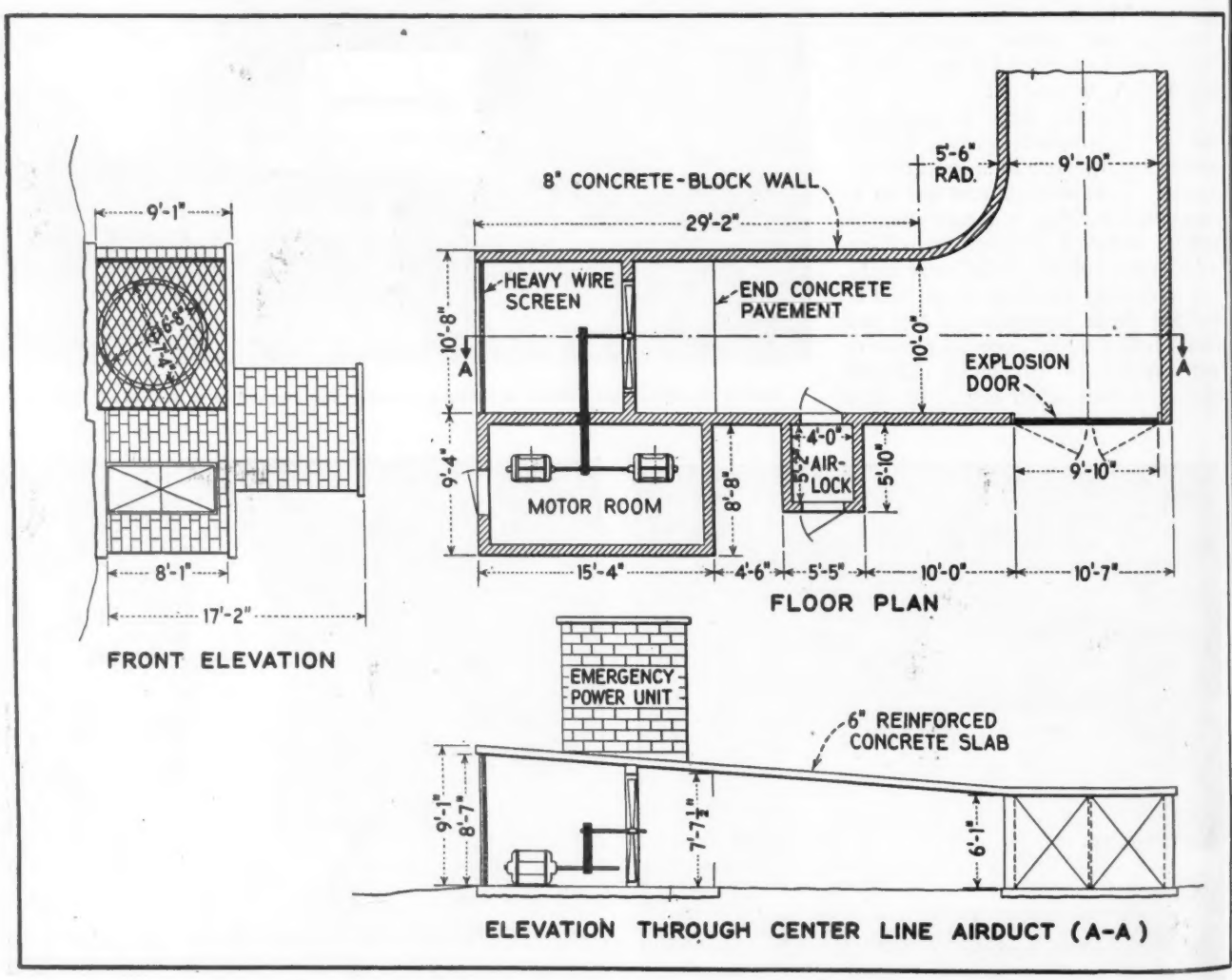
"Total Accidents to Date" and "Total Accidents Last Year" are indicated by fine coal filled to graduated levels in glass tubes at the left on this bulletin board in front of the mine and doctor's office.

will consist of two 100-hp. electric motors (one with coupling disconnected to act as a spare) and a 100-hp. Cummings diesel engine. The latter will be on a floor above the motors.

Because the mine turned out to be a much larger producer and promises to have a much longer life than was expected, planning and constructing adequate outside buildings was somewhat delayed. A combination doctor's office and mine office was only recently completed. It is built of tile. However, concrete blocks were used for an oil house and for another building which houses a shop, supply house and lamphouse.

Supplies and lamps are in the same room so that the supply clerk's helper can tend lamps and also spend some time at working the supplies. A total of 120 M.S.A. Edison units comprise the lamp equipment. The oil house is described in the Operating Ideas section on this issue, p. 126.

Bolair mine is one war baby that reached maturity in jig time and has a fine prospect of being active for many years after Hirohito has been put away.



The new fan with larger motors and a new engine will be installed on the same plan as this temporary fan, which also has two motors and an engine.

FREIGHT RATES *and* INDUSTRY LOCATION

A SIGNIFICANT decision, announced by the Interstate Commerce Commission last May, will take preliminary effect on the 30th of August. It will eliminate some of the advantage in freight rates which Eastern shippers have enjoyed over shippers of the South and West.

The decision has been enthusiastically hailed as an Emancipation Proclamation for industrial development in the South and West. It has also been roundly condemned as a meddlesome control measure that ignores valid differences in haulage costs, and recklessly blots out one of the important factors in determining the location of American industry.

Cooler appraisals indicate that the net effect of the rate changes will be far less drastic than predicted by the more passionate advocates or adversaries. Nonetheless, it is important for the business world to be informed both upon the principle at issue, and upon the forseeable consequences of the ICC ruling.

What The Decision Calls For

The Commission's order, unless modified, or successfully contested in the courts, will require: (1) the eventual establishment of a single freight classification, or grouping of commodities for rate-making purposes, for application throughout the United States; (2) a single level of *"class rates"*—or rates established for groups of commodities and primarily applying to manufactured and semi-manufactured articles of high value—in the area east of the Rocky Mountains. This level is to be about 15 per cent higher than the present Eastern scale.

Because it will take some time, probably several years, to work out a uniform classification in place of the three major classifications now existing, a preliminary adjustment is provided.

Under this adjustment the existing classifications will remain in effect, but the rates on articles moving on *class rates* will be increased 10 per cent in Eastern or Official Territory—the area east of Lake Michigan and the Mississippi River and north of the Ohio River. On the other hand, the rates will be reduced 10 per cent on articles moving on class rates in the South and West, and on those moving interterritorially.

What The Problem Was

At the present time there are marked differences in the levels of the basic scales of class rates in the five major rate territories—Eastern or Official, Southern, Western Trunk-Line, Southwestern, and Mountain-Pacific. It is difficult to average the levels of rates, but if the level of the class-rate scale in Official Territory is taken as 100, the levels in the other territories may be roughly considered as follows: Southern, 139; Western Trunk-Line, 128, 146, 161, 184 in Zones I, II, III, and IV, respectively; Southwestern, 161; Mountain-Pacific, 166.

These are over-all comparisons. On many individual articles the differences in levels of rates are greater or less than indicated because of offsetting differences in regional classification schemes. In many cases, the use of exceptions to the classifications and of special commodity rates has reduced the regional disparity in rates. In fact, on some articles, particularly on certain low-grade traffic such as logs, pulpwood, bricks, coal, sand and gravel, the South and the West have actually had lower rates than Official Territory. The rate disadvantage of the South and West has been principally on manufactured articles.

The territorial differences in class-rate levels have complicated the problem of constructing rates from a point in one territory to a point in another. Today, such a rate tends to represent a blend of the levels in effect at the place of shipment and at the destination. Thus manufacturers and dealers in a higher-rated territory are likely to see themselves at a disadvantage when they attempt to sell goods in a lower-rated territory against competition located there.

Now, if differences between territorial rate levels are removed, the *inter*territorial freight-rate problem largely disappears. So it is an important question whether such differences are justified. The Commission has found that they are *not* justified either by differences in transportation costs or by

other valid considerations. From that finding came the order to establish a uniform level of class rates and a single freight classification.

The Decision And The Map Of Industry

What effect will this decision have on the location of industry in the United States; and what effect will it have on the economic development of the East, the South, and the West?

Today, many in the West and South believe that their higher class rates have seriously retarded the industrial development of these areas, and promoted the concentration of manufacturing in Official Territory. They point out that Official Territory has over 50 per cent of the population of the country, had nearly 70 per cent of the persons employed in manufacturing in 1940, and accounted for nearly 73 per cent of the "value added by manufacture" in 1939. Boasts of industrial development in the South, and to some extent in the West, in recent years are accompanied by claims that this would have been greater but for the freight rate structure.

Another point gets into the argument. Official Territory is not only the country's most highly industrialized section, but also its greatest consuming territory. It is the market which nearly all manufacturers desire to reach, particularly when they have a surplus to sell. Here again is occasion for an outcry by producers outside of Official Territory against the consequences of their high rate levels and the levels of interterritorial rates. Under the circumstances it is not strange that the South and West have argued long and volubly for mile-for-mile equality in rates.

Those in Official Territory deny that the South and West have been handicapped by the rate adjustment, but at the same time look with apprehension at the loss of their rate advantage.

What's The Effect?

However, now that the ICC's ruling is about to be put in operation, it is time for the colorful statements of the debating period to give way to a sober appraisal of what the consequences are likely to be.

In the first place, it should be noted that the preliminary adjustment will affect only a small fraction of the traffic. Estimates indicate that only about 4 per cent of the full-carload traffic moves on regular class rates. About 11 per cent moves on exception ratings which are not affected by the preliminary order; and about 85 per cent moves on commodity rates, which were not within the scope of the Commission's decision. The proportion of less-than-carload lot traffic affected is much greater, since a large part of it moves on class rates; however, less-than-carload traffic constitutes less than 1½ per cent of the total tons carried.

The permanent rate structure will probably affect more traffic than the preliminary order since, in the establishment of a uniform classification containing more classes than at present provided, many articles now moving on exception ratings are likely to be brought within the scope of the classification, and the same may be true of some articles moving on commodity rates.

But, even if a large proportion of the traffic were affected by the Commission's order, or if the principle of equality in rate levels is eventually extended to much of the traffic moving on commodity rates, these freight-rate adjustments cannot be expected to revolutionize the pattern of industrial location in the United States.

It seems evident that most industries now found in Official Territory are located there for other advantages than that of a lower level of freight rates, undeniable as such an advantage is. Insofar as that is the case, they have little to fear from equalization of the rate levels. For those which have, indeed, been dependent upon preferential rates and otherwise badly located, the removal of the preference and their consequent shift to some area possessing a real locational advantage would be desirable from the point of view of the national economy.

While the high degree of industrial concentration in Official Territory does not rest on such a flimsy basis as a lower level of class rates, the Commission's decision does remove one existing handicap to the growth and development of the South and West. The new adjustment should permit all sections of the country to develop the industries for which they have natural advantages. It should contribute to a sounder regional specialization than we have heretofore had.

This decision will neither destroy the economy of the industrial East, nor will it, overnight, assure the industrial flowering of the South and West. It constitutes one sound step toward establishing that equality of opportunity for all sections of the country which is essential to a nation that bears the proud title of The *United* States.

President, McGraw-Hill Publishing Co., Inc.

STRIPPING FUTURE

Involves New Fields and Bigger Equipment

East Takes Lead in Stripping in War Years — Trend to Thicker, Harder Overburden Paralleled by Greater Use of Higher-Capacity Equipment—Haulage and Other Services Improved to Correspond

HIGHER-CAPACITY more-efficient equipment to meet problems growing out of thicker, tougher overburdens is the greatly simplified answer to "What's ahead for stripping." Since installation of the first shovel of the modern type in the Danville region of Illinois in 1911, stripping has shown a steady growth in tonnage and percentage of the total, with a spurt in production since the war started. An outstanding development of the war, forecast, however, by rising activity in Ohio, northern West Virginia and western Pennsylvania in the immediately preceding years, has been the shift in emphasis from Illinois and Indiana to the East.

Illinois lost the lead in bituminous stripping to Pennsylvania in 1943 (Table I) and even Indiana's hold on third place was threatened by West Virginia in 1944. Kentucky also went into the over-5,000,000-ton class in 1944. When stripping conditions and equipment are considered, this borders on an astonishing achievement, even if war-stimulated. A large part of the eastern tonnage has been produced by small equipment from hillside outcrops, although the East now boasts a growing number of big shovels and draglines.

Can Gains Be Held?

Can the East continue to hold its lead? A hard-and-fast answer would require an unusual willingness to stick the neck out. However, as stated, most of the stripping in the East—and South—is of the outcrop type with all it connotes in coal characteristics. Now that the market will take almost anything, the character of the coal is a less important point. With a return to something approaching normal conditions, quality will again become more of a factor in the selection of stripping sites and probably will rule out many that now are operated as a matter of course. However, it is possible that a growing number of consumers have learned to work with and like coal they never would have considered in the old days and this may act, with improved preparation, to stay the demise of some properties.

Activity in stripping, like activity in other pursuits, tends to generate more activity and that adage is receiving its latest proof in the East and South. When stripping in those areas began to climb a few years ago, increasing interest resulted in more and more study of possible sites and methods, thus uncovering opportuni-

Anthracite shares in the trend toward larger stripping equipment with this 25-cu.yd. dragline with 180-ft. boom.

Five-Year Trend in Strip Production by States

	1940	1941	1942	1943	1944*
Alabama	75,641	238,447	299,983	427,039	493,985
Arkansas	25,808	87,390	182,835	302,762	450,000†
Colorado	12,460	15,689	6,755	8,917	16,276
Illinois	13,075,255	13,945,633	15,835,348	16,617,826	18,076,122
Indiana	10,039,078	12,739,006	14,475,660	13,310,466	14,140,000
Iowa	725,912	696,501	704,762	665,588	509,177
Kansas	2,755,704	3,236,320	3,617,813	3,033,500	3,017,707
Kentucky	862,475	1,249,125	1,436,160	1,945,384	5,018,638
Maryland	.....	12,665	23,465	123,723	116,556
Missouri	1,980,846	1,999,621	2,340,354	3,383,990	3,460,000†
Montana-Texas	1,171,848	1,472,615	1,793,466	2,708,306	2,750,000†
North Dakota	1,405,590	1,527,144	1,715,489	1,749,722	1,523,445
Ohio	5,047,597	7,315,247	9,324,641	9,489,716	9,900,000†
Oklahoma	621,641	745,387	1,101,653	1,449,244	1,521,683
Pennsylvania—bit.	4,230,162	8,429,778	11,456,529	17,993,485	22,211,661
South Dakota	61,803	66,430	49,176	39,059	50,000†
Tennessee	1,654	1,600	.....	1,877	50,000†
Virginia	6,400	2,717	.....	.....	3,000†
Washington	15,960	12,115	39,511	27,134	25,000†
West Virginia	873,583	1,098,619	2,613,094	6,088,271	12,336,978
Wyoming	177,920	179,560	185,969	319,166	480,772
Total	43,167,336	55,071,609	67,202,663	79,685,175	96,151,000*
Pennsylvania—anth.	6,352,700	7,316,574	9,070,033	8,989,387	10,925,619

* Preliminary figures—subject to later revision.

† Estimates from best available data.

ties hitherto passed over. All in all, the picture is one of continued major activity after the war, even though some recession may be expected in eastern and southern areas. Everything points, however, to more strippings in those areas on the same order and magnitude as those in the original stripping strongholds, provided there is no major upheaval, legislative or otherwise, to curtail opportunities.

Reclamation Problem Grows

The evidence also points to the fact that strip miners are going to contend more and more with the problem of what to do with spoil banks. As it stands now, despite the recent defeat of legislative restrictions in Ohio and Missouri, strippers are confronted with perhaps two alternatives, especially in the new areas of the East and South: (1) voluntary adoption of a program of their own satisfactory to the public, or (2) a growing—and perhaps losing—battle against laws that would handicap operations and add to cost.

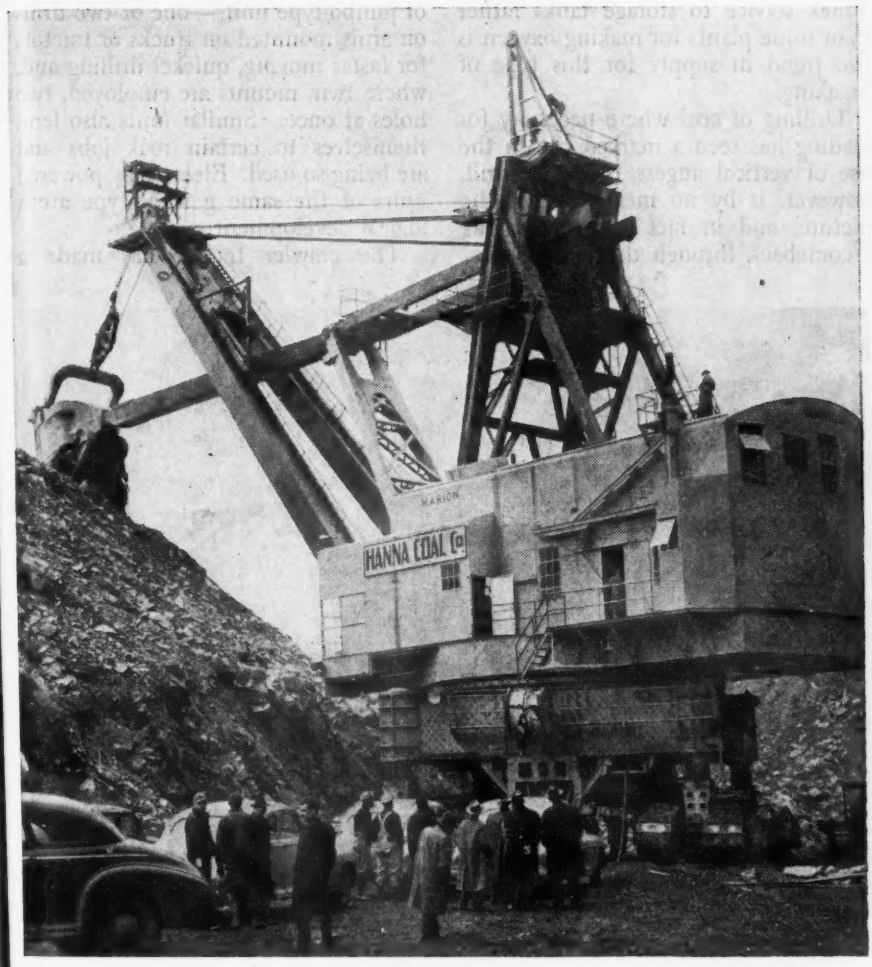
Most of the legislative proposals turn on a point the majority of the leading strippers agree is a matter for industry action and a responsibility they are ready to discharge. They already have considerable knowledge in the field of reclaiming and utilizing stripped areas and object, with reason, to laws based on theory and untested suggestions. In this respect, the future in stripping may be expected to witness increased industry attention to utilization of spoil areas, accompanied by more research to develop new and economically feasible methods of making such areas yield maximum dividends in recreation and cash crops, as well as in pleasing appearance.

The future in production, as already intimated, is one of thicker overburden with more rock to be handled. This, naturally, is the result of a gradual evolution in stripping from the day the first man started with a pick, shovel and basket, or other similarly simple facilities, and is not to infer that the easier stripping is near exhaustion. A look at the hundreds of miles of outcrop over the country alone leads to the conclusion that there is plently of easy stripping left aside from that existing in the older areas. Nevertheless, particularly in the earlier stripping centers, the situation is one of thicker, tougher burden and that also will become increasingly the situation in the new fields.

With the trend toward harder stripping, the open-pit operator is keeping more of an eye on deep-mine improvements. His conditions, in many cases, are getting no better while modern equipment and methods are improving the deep operator's chances of getting an output per manshift approaching his own. A number of deep operators, in fact, have set the strip average as their goal and feel they have a good chance of reaching it, while some strip operators concede that costs as good as the "average" in stripping have already been achieved in a few instances through efficient mechanical mining underground. This is not to infer that the differential between deep and strip mining is to be wiped out soon, or even eventually, but the possibilities of new deep equipment and methods already have been reflected in dual operation—deep mining to supplement stripping. The number of such operations will increase in the future if higher efficiency underground leads to a reconsideration of the limits of economical stripping, although, of course, improvements in stripping equipment and efficiency may make such reconsideration unnecessary or even weight the scales the other way.

Cost Trend Down

Selling price of the coal in relation to cost of handling overburden is the major factor governing the practicable limits of stripping. Higher-capacity, more efficient equipment, meaning lower cost per cubic yard, permits handling more burden per ton or recovering a thinner or less valuable vein under the same cover. In the anthracite region, as an example, new equipment is making possible costs permitting production from areas hitherto considered impracticable. It also is increasing the depth to which strip-



Stripping expansion in the East is marked by increased use of large equipment, such as this 35-cu.yd. shovel shown during dedication ceremonies.

ping can be conducted. Draglines as large as 25 cu.yd. are evidence of the new horizons in anthracite stripping. Another straw in the wind is the recent announcement that a Mammoth Vein stripping approximately one mile long in a V 1,200 ft. wide at the top and 850 ft. deep on the legs, with one leg the bottom rock under the coal vein.

Larger Haulage Units Forecast

Because the value of the coal is greater, anthracite indulges in rehandling and hauling of rock to an extent impossible in bituminous. In addition to larger stripping units, the future also undoubtedly will bring larger haulage units better designed for increased capacity on the heavy grades frequently encountered. Four- and six-wheel, half-track and crawler drives, in the opinion of many, will be seen in greater numbers with diesel engines and engines using other special fuels increasing in use for moving both coal and rock.

Despite the fact that big units will be used more often in anthracite stripping, the small shovel and dragline will retain its dominant position for a large part of the work. However, new units will have more digging and dumping reach for working at greater depths and spoiling at greater distances. Consequently, more coal can be reached before the site is abandoned or rehandling or haulage must be resorted to. Even in these latter operations, higher equipment capacity should speed up the operation and consequently widen the opportunities.

While it was only recently that anthracite began to present as big a contrast in size of equipment, the bituminous picture has long been one of great variation. The rebirth of stripping in the East (Ohio was one of the first users of what were, in their day, big units) was based on the small shovel (draglines occasionally) of the regular contractor type. Such equipment still is carryng the major part of the production load, and since stripping in the East and South is primarly a matter of hillside outcrops, it probably will continue to do so, even though the number of large machines bids fair to rise fairly rapidly.

Ability to handle more material at the same or lower cost is a characteristic as eagerly sought after by strippers operating small equipment as large. The results include greater yield per site and increased tonnage of better coal by raising stripping limits from, say, 35 to 40 ft. to 40 to 50 ft. Even before the war small equipment specially designed for stripping was being offered to meet this need. The future undoubtedly will bring more and more high-lift shovels with increased spoiling radius in capacities up to 5 cu.yd. or so. More power and simplified feather-touch controls will add to efficiency. In the field of draglines carrying buckets of similar capacities booms of 100 to 125 ft. or more, with power plants and controls providing substantially faster digging and swinging, may be expected to go into service in increasing numbers.

The truck, and to a lesser extent the semi-trailer, is practically the only haulage unit at strippings using small equipment. One war-time measure that may continue into the future is the use of flat-bed trucks in connection with special dumps. Such dumps, or trucks with gravity-dumping bodies, seem slated for increased application. Larger trucks of other types, more and more equipped with diesels, also are in the picture for the future, together with more semi-trailers like those employed for some time in the pits using big equipment.

Bigger Shovels Expected

The shovel will experience much more competition from the dragline in the future at strip operations using large equipment. The drive for higher efficiency and capacity stimulated, in part at least, by thicker and harder overburden also is reflected in plans for dippers with a capacity of 50 cu.yd. or more. The first machine carrying such a dipper probably is not too far in the future. Better design and, perhaps, additional power, with the modern controls now available, will result in additional capacity and ability to handle thicker, harder burdens.

The dragline, now being used in increasing numbers with 25-cu.yd. and larger buckets, will, as intimated, become a greater and greater factor in future stripping operations, either for benching to help shovels in deeper digging or for the entire stripping job. Ability to handle cover up to 70 ft. or more and additional power, modern controls and other facilities to give it capacity equal to shovels carrying dippers of comparable sizes make the large dragline loom as a bigger and bigger factor—a conclusion borne out by the trend of sales.

Helping shovels in thicker burden long ago was responsible for tandem

operation and more recently for the use of other auxiliaries, such as the scraper. As this condition becomes more prevalent, assuming the decision is not to go underground, tandem units and other auxiliaries, including the wheel excavator and units yet to be developed, will become the subject of increasing study, along with methods of casting and spoiling, including greater attention to when and how much rehandling is economically feasible. New and higher-capacity equipment now offered or expected, in the opinion of many, may materially alter views now held on spoiling and rehandling, although the fundamental consideration that permanent disposal of the spoil in one pass normally is the cheaper will continue to prevail.

With deeper overburden and more hard material, developments in drilling equipment have paralleled and are paralleling those in stripping equipment—more power, speed and capacity. At the same time, also, improved and more efficient equipment, including power and hydraulic feeds, are being brought out to meet the needs of the stripper using small equipment.

Better Drills Coming

The horizontal drill is expected to continue in its leading role in preparing overburden. A development holding promise for the future is new high-alloy specially tipped bits providing greatly increased drilling speeds and better drilling results with no other equipment changes. With the trend toward thicker overburden containing more rock, and especially burdens with hard layers high in the bank, vertical drilling, often accompanied by "decking" of the charges, is staging a comeback. In addition to heavier, more powerful and faster churn drills, the future is expected to bring additional vertical auger installations and more rotary rigs with better feeds, drives and bits to increase performance. Twice or more the hole footage in the same time is foreseen as a general rule with new units and methods.

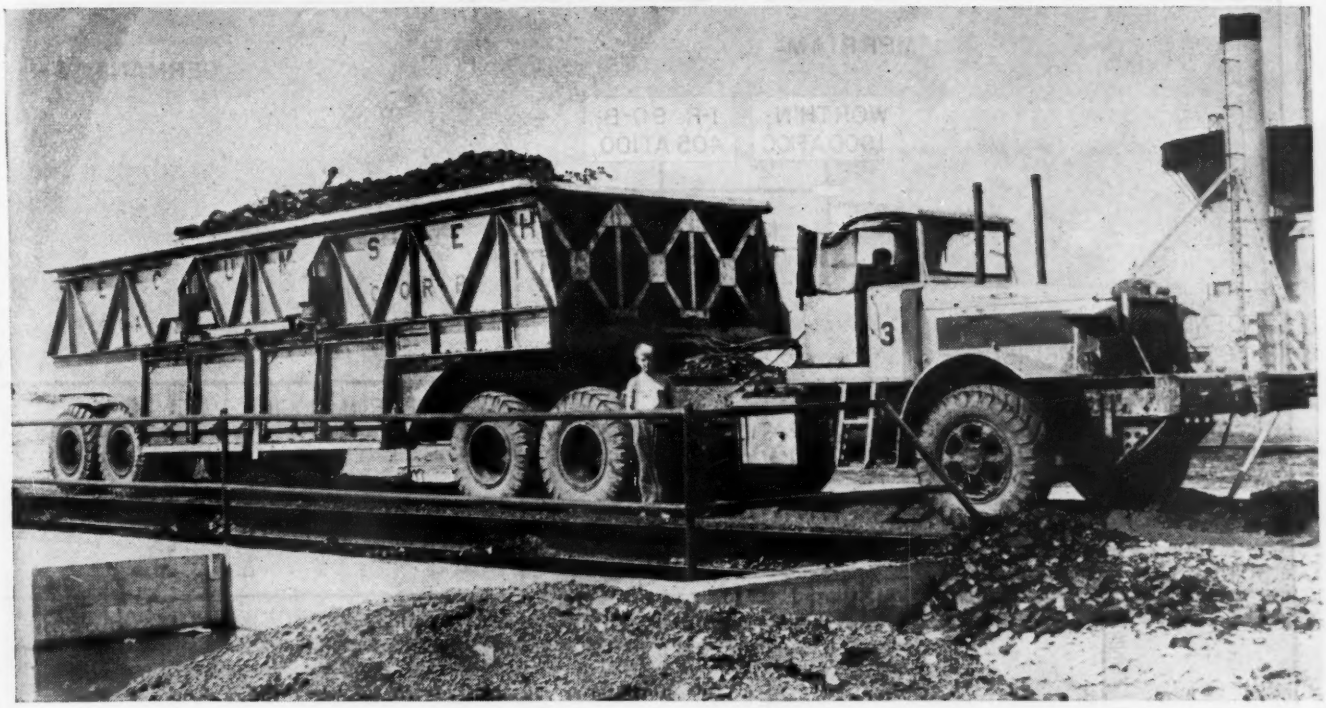
Hole size is definitely on the upward trend, especially in vertical drilling. Advantages already proved by experience include ability to get more explosive where it may be needed and, usually, an increase in hole spacing. The new drilling units provide the larger holes with the increase in speed and capacity already noted. For breaking overburden new types of explosives are being developed and tested although an old breaking medium pioneered in 1924—liquid oxygen—is attracting more and more adherents. Truck service to storage tanks rather than mine plants for making oxygen is the trend in supply for this type of breaking.

Drilling of coal where necessary for loading has seen a marked rise in the use of vertical augers. The air drill, however, is by no means out of the picture, and in fact may be staging a comeback through the development of jumbo-type units—one or two drills on arms mounted on trucks or tractors for faster moving, quicker drilling and, where twin mounts are employed, two holes at once. Similar units also lend themselves to certain rock jobs and are being so used. Electrically powered units of the same general type are a logical development.

The crawler tractor has made a

Small high-lift shovels and longer-range draglines are slated for increasing use in outcrop stripping in the future.

Tractors become more versatile. This unit mounts a ¾-cu.yd. loading unit.



Bigger haulage units are scheduled for wider use in days to come in stripping. Straight-truck size also is increasing and new-type drives are finding wider use.

permanent place for itself in stripping —a place that recently has been extended to stripping itself as a result of the development of the big scraper with rooter and other auxiliaries. New controls, incidentally, are expected to reduce the strain of operating tractors and auxiliaries and thereby increase efficiency. In addition to carrying drills the tractor also is the basis for coal- and material-handling rigs of various types. A number of loaders built on tractors already have gone into service and under certain conditions their use may be expected to increase. While the standard shovel will retain its dominant position in loading, sufficient special conditions exist to warrant the conclusion that the future will bring an increasing use of special loaders, including underground types, along with pinning machines or other special coal-breaking units, as well as more power brooms and other modern coal-cleaning units, including scarifiers.

Dual Haulage Finds Its Place

In haulage, experience has proved the economy of automotive equipment for pit gathering and, where conditions are right, haulage to the preparation plant. Time also has brought about a better appreciation of the relationship between rail and automotive haulage. This better appreciation of the place of each has been responsible for a growing number of dual systems with automotive pit gathering and rail movement to the preparation plant with modern steam, diesel, diesel-electric or electric locomotives and cars. More such systems may logically be expected in the future as hauls grow longer unless, as has been the case at a number of properties recently, the preparation plant is moved to put it within the limits of economical truck transportation.

Bigger Trucks Coming

Truck and tractor-trailer units will be bigger in the future, in the opinion of most authorities, for at least two reasons: (1) the cost per unit is not doubled by doubling the size, for example, and (2) driving labor and maintenance are reduced almost in proportion. Improved engines, improved transmissions, improved tires and better materials in other directions also will promote efficiency and reduce maintenance.

Roads and road maintenance will be better. Real highways with width, grades and surfaces for safe, high-speed operation already are finding increased use. To get the most out of the new equipment that will be available for transportation, roads undoubtedly will be improved even more in the future.

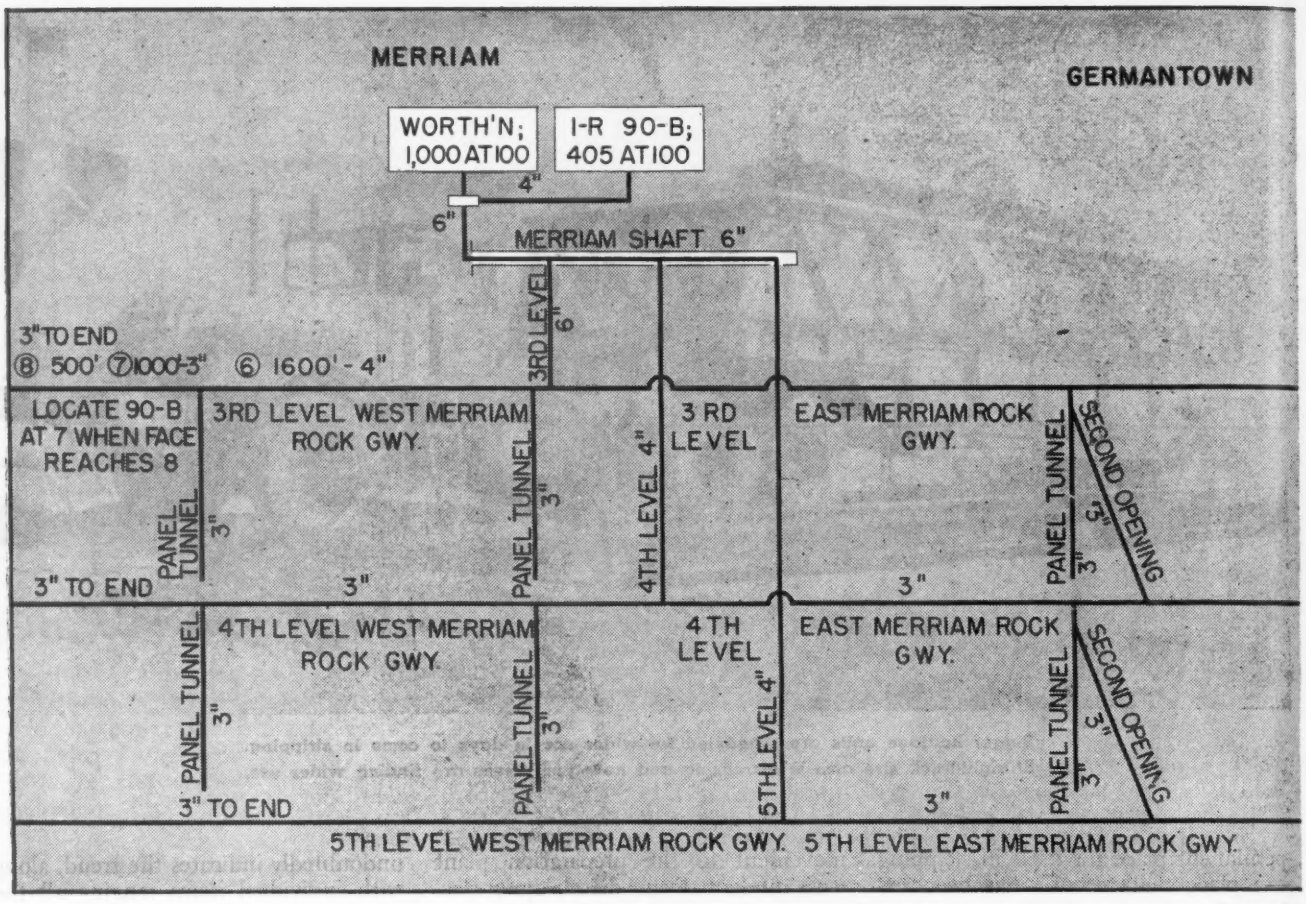
Services in stripping also are seen as sharing in improvements in the years immediately ahead. In maintenance, for example, erection of a number of modern well-equipped shops undoubtedly indicates the trend, along with individual items ranging all the way from additional welding and repair trucks to self-propelled cranes for handling parts and materials in yards and in the field.

Water handling is expected to result in more preventive measures of the nature of ditches, drainways, dams and catchbasins, with improved full automatic pumps furnished with weatherproof controls for other drainage service. New quick-coupling pipe —a wartime development—may well find a real place in strip drainage.

Power for stripping has recently been characterized by extension of the use of grounding and other measures for greater safety, as well as improved lightning protection. New equipment for power-factor correction and stabilization of line voltage is expected to see extended service in the years to come, along with unit substations and three-phase transformers.

Opportunities Still Plentiful

To sum up, stripping's problems are getting somewhat harder as time goes on. The center of gravity is shifting —at least temporarily—and improved underground equipment and methods are offering a growing challenge. New and higher capacity equipment and facilities, however, provide management with an opportunity to overcome more difficult conditions and go on to even higher efficiencies.



Germantown colliery air-line layout. All pipe is requisitioned and installed in

COMPRESSED-AIR LAYOUT

Anticipates Future Demands of Colliery

Planning in Advance Designed to Insure Good Air Service Throughout Colliery Life—Mains of Predetermined Size Installed to Plan at Germantown — Portable Compressors Boost Pressures in Dead Ends

By **WALTER B. WILLIAMS**
Division Superintendent

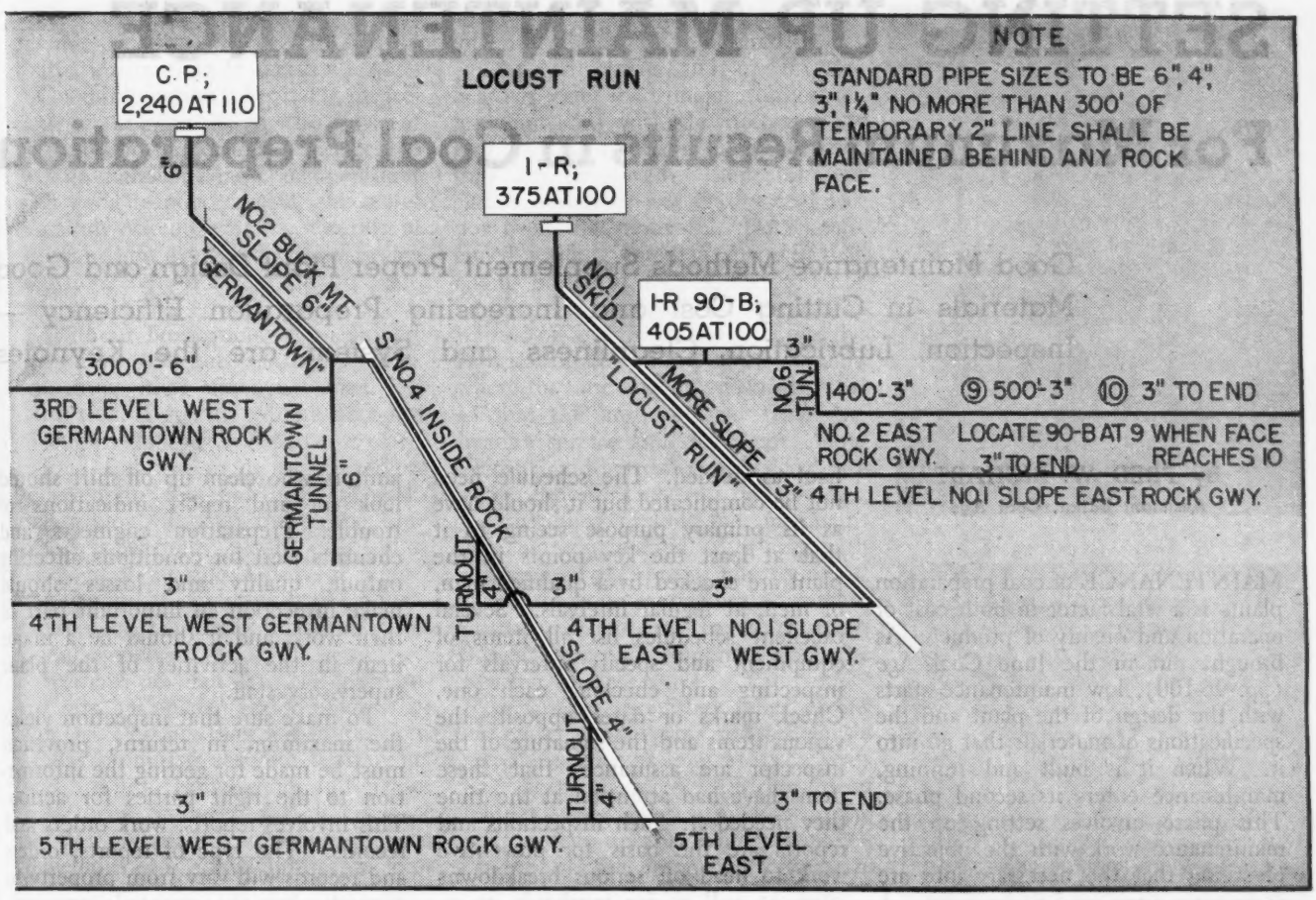
And **GORDON E. SMITH**
Colliery Superintendent
Raven Run Coal Co.

WHEN collieries are developed to great distances from the points of air supply, the effective air pressure at the point of use is found to be insufficient in many instances. An examination at the time usually discloses the presence of undersized lines in varying diameters and for varying distances through the long and tortuous passageways to the point of use. In other words, the system of air lines, like Topsy, "just growed."

The Germantown colliery of the Raven Run Coal Co. was faced with a dual problem in that it is not only a long and narrow property but also because three points of attack and three generating points for compressed air were planned. The workable property extends approximately 3,500 ft. east of Locust Run. The intervening distance between Locust Run and Germantown is approximately 4,000 ft. Between Germantown and Merriam it is 6,000 ft. and the workable portion of the property extends another 6,000 ft. west of Merriam.

It was decided to make a comprehensive study not only of the existing situation but also of future situations that would arise if the proposed developments were carried out. The varying demands of the different shifts accentuated the necessity of interconnecting all three generating points to offset these varying requirements.

At Germantown Slope a two-stage Chicago Pneumatic synchronous compressor with a capacity of 2,240 c.f.m. at a pressure of 110 lb. per square inch



accordance with this plan for maintaining good compressed-air service to the face.

was installed, this being the largest unit and also adjacent to the greatest demand. At Merriam, a Worthington two-stage synchronous compressor with a capacity of 1,000 c.f.m. at 100 lb. pressure was installed. Here a study of the development forecast brought forth the fact that an additional unit would be required in a comparatively short time and an Ingersoll-Rand two-stage air-cooled compressor capable of producing 405 c.f.m. at 100 lb. pressure will be installed and deliver into the same receiver as the Worthington compressor. At Locust Run the immediate need was met by the installation of an Ingersoll-Rand single-stage water-cooled compressor delivering 375 c.f.m. at 100 lb. pressure and an Ingersoll-Rand two-stage air-cooled compressor with a capacity of 405 c.f.m., also at 100 lb.

Further study revealed that it would be practicable and economically sound to interconnect these units. This necessitated a comprehensive study of the anticipated demands at various points in order to provide mains which would deliver sufficient air at the proper pressure and balance the compressor loads.

To keep the supply items within a reasonable limit, the distribution system was studied to ascertain the practicability of selecting a certain few sizes. The result of this study narrowed the required pipe sizes to four: i.e., 6-in., 4-in., 3-in. and 1¼-in. Using the first three sizes as mains, the distances and loads were calculated and one of the three sizes was selected either for the full distance or for part so that the working pressure at any face would not fall below 90 lb. while at the same time, where mains from one generating point were integrated with those from another, there would be no great degree of unbalanced pressure.

The development of the mine was to proceed in panel sections, and to minimize the length of air line in active use it was decided that feeder lines would be carried through panel tunnels and second openings from the Third Level mains to the lower levels at regular intervals. This would release all of the pipe outby the last connected panel tunnel. The map shows but one panel tunnel on each level as a scheme, but several panel tunnels will be driven in each instance and beyond the Germantown and Merriam sections.

The results of these studies were reduced to a plan, and this plan has now become the guide for all air-line installations at the colliery. Copies of the plan are posted in the foremen's offices at the mine and are used as guides as the work in each section advances. Requisitions for air-line material are made up from the general plan. As installation progresses it is posted on the plans at the colliery.

One exception to the standard pipe size is being permitted. Because of the severe service imposed upon air lines leading into active rock faces, rock contractors are permitted to maintain a temporary 2-in. line to the working face. When the face has progressed a satisfactory distance beyond the main, the 2-in. temporary line is taken up and a larger main installed.

It also should be noted that to reduce the size of mains in dead-end gangways, advantage is taken of the portability of the air-cooled compressors by moving them nearer to the face as the lines are extended.

The authors acknowledge their appreciation to John M. Peterson, district sales manager and engineer of the Ingersoll-Rand Co., and F. Edgar Kudlich, special engineer, Raven Run Coal Co., for their assistance in the planning of the foregoing air-line system.

SETTING UP MAINTENANCE

For Maximum Results in Coal Preparation

Good Maintenance Methods Supplement Proper Plant Design and Good Materials in Cutting Cost and Increasing Preparation Efficiency — Inspection, Lubrication, Cleanliness and System are the Keynotes

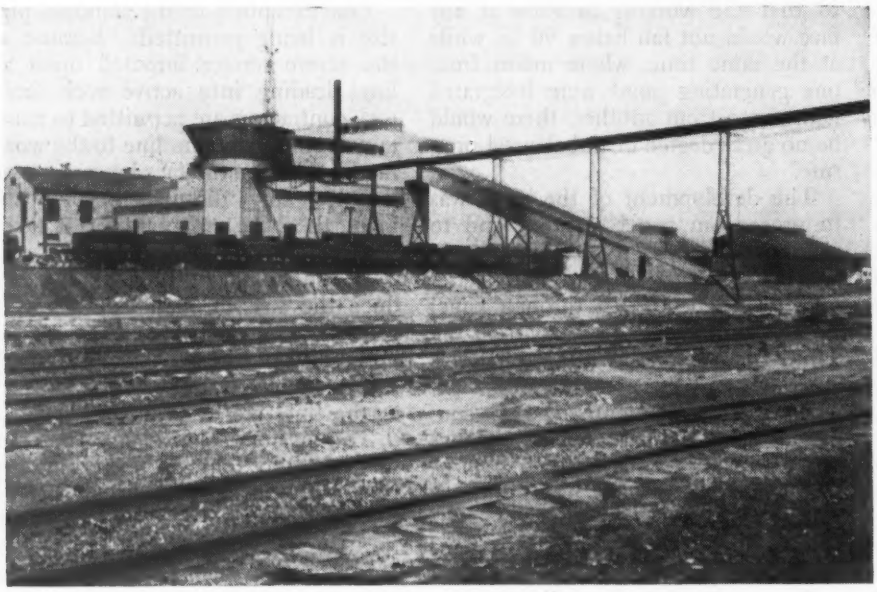
By FRED W. RICHART
Assistant Editor, Coal Age

MAINTENANCE of coal preparation plants is a vital factor in both cost of operation and quality of product. As brought out in the June *Coal Age* (pp. 96-100), low maintenance starts with the design of the plant and the specifications of materials that go into it. When it is built and running, maintenance enters its second phase. This phase involves setting up the maintenance work with the objective of seeing that the necessary jobs are done when they need to be done. A corollory phase is keeping track of advances in materials so that they can be incorporated into the plan where possible to insure that the operation is kept in the best possible condition to perform efficiently at low cost.

System pays real dividends in preparation maintenance. It involves a study of the plant and its equipment and the drawing up of a schedule covering inspection, lubrication and overhaul as needed. The schedule need not be complicated but it should have as its primary purpose seeing to it that at least the key points in the plant are checked by a qualified man, or men, at regular intervals. Several excellent schedules list all items of equipment and specify intervals for inspecting and checking each one. Check marks or dates opposite the various items and the signature of the inspector are assurances that these items have had attention at the time they needed it. Such inspections and reports are the basis for preventive work to head off serious breakdowns later, as well as for overhauls or replacements.

It should not be assumed, however, that a schedule eliminates the need for other attention. As a matter of fact, continuous attention to plant condition should be the watchword of all who work in it or with it. Operators should keep an eye constantly on units in their charge and report anything that needs attention. Oilers who see every moving part on shift and janitors who clean up off-shift should look for and report indications of trouble. Preparation engineers and chemists alert for conditions affecting output, quality and losses should make inspection an important part of their work, and it should be a major item in the activities of the plant supervisory staff.

To make sure that inspection yields the maximum in returns, provision must be made for getting the information to the right parties for action. This involves reports, work orders and records. The type of reports, orders and records will vary from property to property, but the essential consideration is creation of a record that will show what needs to be done and when. Such a record tends to insure action where needed at the right time and reduces buck passing.



A modern coal washery—aluminum paint outside, clean inside.

Records Help Out

Records of delays and their costs round out any inspection and reporting system. They show where the trouble is and by the same token point to the means of eliminating it. Consistent heating of a bearing or trouble with a motor, for example, shows in a record of inspections and delays. This record may, therefore, provide evidence that overloading prevails in some parts of the plant, even if it were not, as is often the case, reflected in the quality of product. An adjustable feed to the wash-box may be the answer to the latter.

In addition to reports on equipment operation and condition, correct setting of motor controls will reveal conditions that should be corrected in the interests of low maintenance and product quality. Circuit breakers and overload devices, therefore, accomplish a secondary purpose of real value in addition to their primary one of preventing damage to equipment. They should, therefore, be installed and used, and if such use results in frequent stoppages the answer may be

larger motors, a reduction in load if possible, or some other step to remedy a situation tending to increase cost.

Good lubrication is as vital as inspection in keeping down the cost of preparation maintenance. In fact, the two go hand in hand at operations with good records. Again, the secret is a study of requirements, selection of the right lubricants and systematic application, reinforced by reports and records.

Without lubrication, all machinery in motion soon fails. It is, therefore, one thing that must be done. If done well, it greatly reduces time lost through stoppages and the cost of repairs. Lubrication is recognized as so important that practically all washers employ oilers on the shift. One 600-tons-per-hour plant uses four. They have the added duty of reporting potential failures which clean equipment and close scrutiny may frequently uncover.

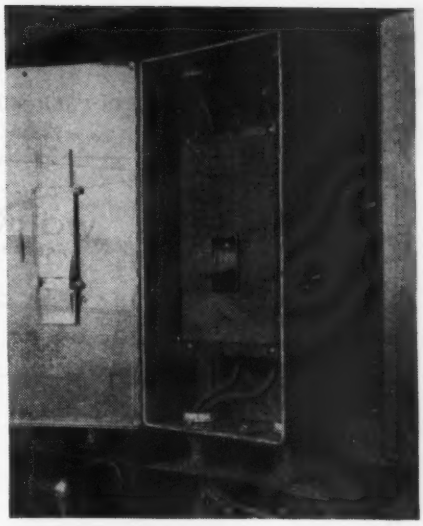
Perhaps no branch of the mechanical arts has made greater progress in the last 25 years than has lubrication. It has promoted accurate bearing fits and finishes. Suitable oils and greases have been produced for all types of service. Numerous devices have been developed to apply lubricants economically. High-pressure grease guns and lubricating systems overcome clogged pipes and feed grooves. Oil companies have a huge fund of information that is available for a postcard. Consequently, there is no longer any excuse for undue bearing wear. If it occurs, the reasons usually are carelessness and ignorance in the face of information begging to be used.

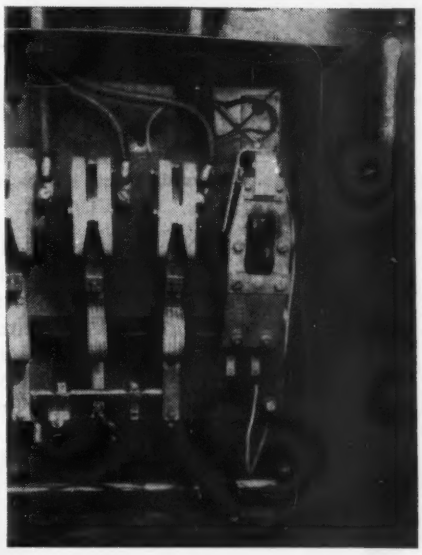
Conveyor chains and under-water bearings offer two major lubricating problems, but with the necessary attention there is reason to believe that they can be solved. Lubrication of chains buried in wet or dry coal has not been too successful. An experienced washery foreman suggests that chains buried in dry coal had best not be oiled. In wet coal the lubricant is washed off and the chains wear rapidly. Lubrication of chains is successful only where they are kept free from the coal so that the lubricant may reach the bearing surface and stay there. Conveyors handling oil-sprayed coal are an exception. They run right along.

Drip oiling of link and pin chains is a common method. Flushing with a stream of oil during one round of the chain once every hour is another practice that seems to have merit. Some of the oil is bound to reach the wearing surfaces.

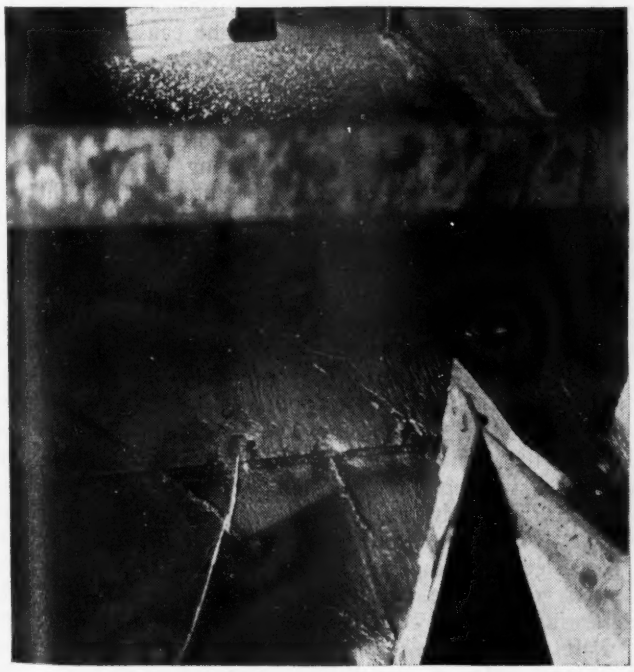
When pressure-fitted roller chains on raw-coal conveyors are religiously greased, service as long as seven years has been recorded. "Motor-driven hand-operated grease guns will do the job," says an operator who gets results.

One of the important things to

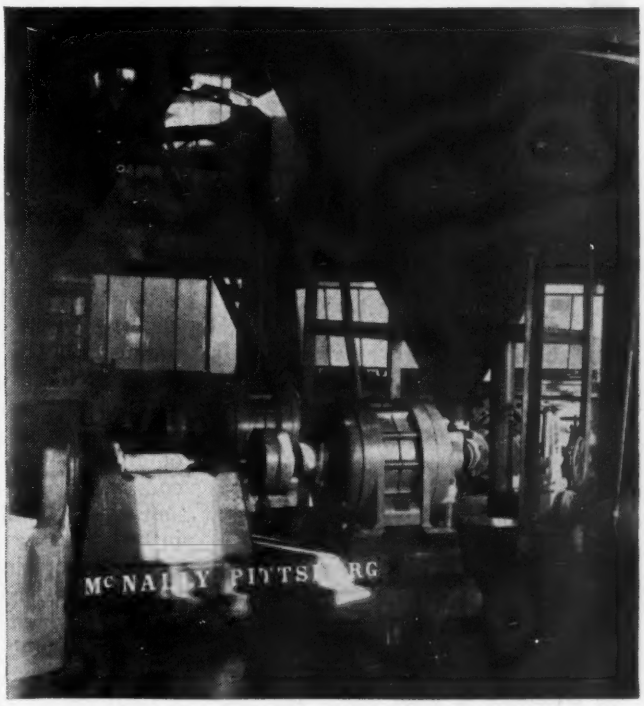




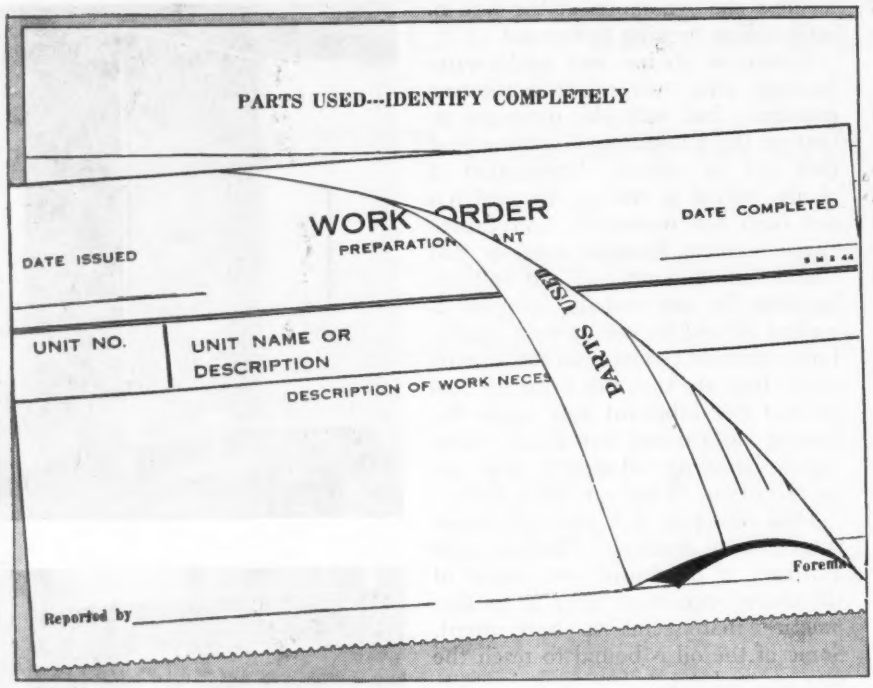
Modern control for squirrel-cage motors. The air circuit breaker (above) opens on short circuit; may be reclosed immediately and service restored. The contactor (below) opens on sustained overloads. There are no fuses.



Eroded discharge chute from jig box. Bolt heads result in cutting deep grooves.

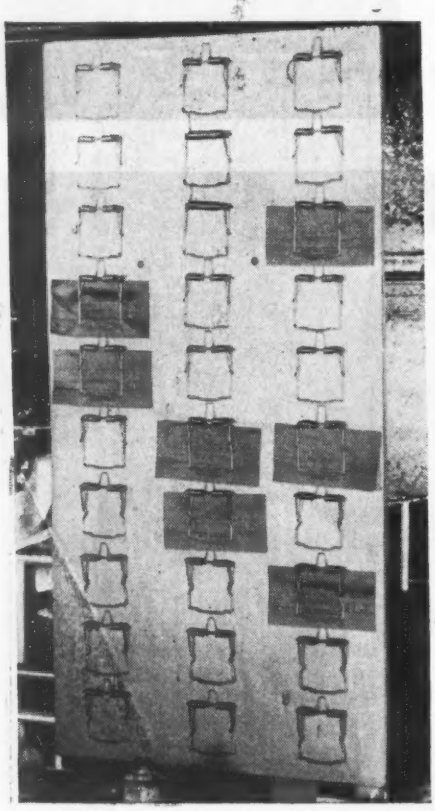


A clean pumproom. Even the floor is flushed clean.



Both sides of a preparation-plant work order. It is made in two duplicate halves, a revision of the triplicate idea.

watch when pressure greasing is to wipe the fittings clean before applying the grease. It is not possible to prevent undue wear without doing this. This is doubly true in plants where sand or other gritty material is used in the wash water. It is equally important that oils and greases be stored in a clean, dust-free room, that the containers be kept covered and that, if possible, the lubricants be transferred into grease guns and oil cans without contact with the air. Another protective measure of great value is a tight cupboard for storing all grease guns and portable containers. Such containers should be kept spotless on the outside. It helps promote the habit of cleanliness.



Bulletin board holding work orders, which get preference in order down. The holding clips are springs from rat traps.

Jig-box elevator chains get the worst abuse. Lubrication is not possible. The remedy is using material that will resist abrasion to the greatest degree. Cast-manganese-steel links and pins meet that condition very well. They seem to be the present-day answer to that problem.

Under-water bearings offer another difficult problem. Pressure-lubricated bearings do not seem to help much. Plastic bearings, continuously flushed with water under pressure to keep abrasives from entering, are very promising. This type of bearing material is successful for high-pressure slow-moving journals such as those in rolling mills. They have a proved life of around three years on the refuse conveyors of chloride coal washers, and they are well worth further study in other coal washers.

Rubber bearings (brass sleeves lined with rubber having water grooves the entire length of the bearing) show a good life on the tail shafts of chloride wash-box conveyors. Since water is a lubricant of rubber, such bearings put out by some of the rubber companies also are worth testing in the general run of wash boxes. They are not expensive and may prove to save a lot of time and money.

While the details will vary with the type of plant, it is agreed, as stated previously, that good lubrication depends on system, in turn based on knowledge of the requirements of each item of equipment in the plant. If the coal company has the staff with the requisite knowledge, it can make its own study, select its own list of lubricants and set up its own lubricating schedule. A more common practice that pays dividends is to call in a representative of the lubricant manufacturer to help make out the lubricant list and lubricating schedule in conjunction with the preparation-plant staff. Normally, the best results are attained by giving each item a number and preparing report forms that prescribe the intervals for lubrication and the type and quantity of lubricant to be applied. When completed and signed by the oiler such reports show that lubrication has been done when and where it should and fixes responsibility. Since it also is necessary to report where lubrication cannot be done, steps can be taken immediately to remedy the equipment defect or other condition which, if allowed to continue, would result in a breakdown.

Inspection Facilitated

Systematic lubrication also provides an excellent opportunity for inspection of equipment condition, and oilers also should be qualified to look for things that might cause trouble and should be required to report on them. Good lubrication also requires the right tools and equipment and that should be an important item in setting up any lubricating system.

As might be inferred from the preceding, the general practice in coal-mine preparation plants is to use oilers or greasers and lubricate each point individually. This has the advantage, among others, that oilers and greasers also can, as pointed out, inspect at the same time. Centralized lubrication is an alternative and a few plants have been built with such systems for a part or all of the job. In addition to the possibiilty of some saving in labor, such systems, with their automatic features, tend to insure oiling or greasing according to schedule through elimination of the human element. Improvements in centralized equipment in recent years make them worthy of increased consideration in selecting a lubricating system.

Good housekeeping is becoming

popular. A recent visitor to a modern preparation plant, who cherished the popular belief that everything connected with coal must be a mess of grime and dirt, exclaimed: "I didn't know a coal washer could be so clean." At least one plant has a janitor who goes gunning for dirt "with a broom in one hand and a paint brush in the other." Another has three janitors, one on each shift, who also help the repairmen over the hump in a pinch. The third-shift man wipes all the handrails. The visitor needn't soil his hands—much.

Cleanliness Is Profitable

Good housekeeping has merit even for coal mines. A surprising number of coal operators believe that cleanliness is profitable. When complimented about the neatness of one of his plants a progressive manager said: "You will find all the others [four] just like it." The maintenance foreman in another clean and polished operation said: "Men don't mind working on a clean machine." Setting forth his plans for a new job, a coal executive of long experience declared: "This is going to be the cleanest coal plant in the United States."

Aluminum or gray paint inside the building greatly increases the light and shows up the dirt. A floor devoid of rubbish looks well and promotes safety. In a clean plant tools have a place and can be found when needed. Toilets that a visitor would not shy away from promote comfort and loyalty. Last, but far from least, potential failures are more readily found in a clean machine than under a year's accumulation of grease and dirt.

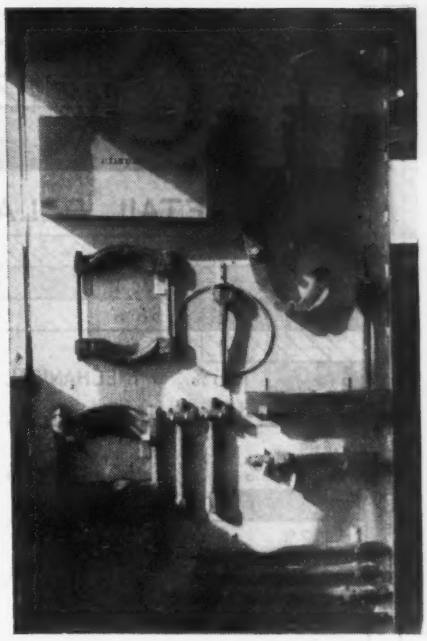
Water also is a factor in the maintenance of wet preparation plants. The acid content of wash water may be so high that it must be treated to prevent corrosion of wash boxes, flumes, cones and piping. Some companies also have found that considerable investments in dams and pipelines to get good water have paid off. The term "pH" is applied to water to indicate its acid or alkaline condition. The degree of this condition is denoted by figures, the numeral 7 indicating water that is neutral—neither acid nor alkaline. Below 7 the water is acid, becoming progressively more so as the number gets smaller. Above 7 alkalinity increases with the size of the number.

Laboratory tests prove that water with a pH of 9.6 has a minimum corrosive effect on iron. It is stated by washery chemists that a pH of 3 or even 4 is very corrosive and will "eat up" the equipment. Many consider it necessary to check the water supply frequently to be sure it is not corrosive. Such tests are customarily made by adding a suitable chemical (there are several) to the water to be tested and matching the color with a chart.

The acidity of water around a strip mine depends on conditions. It may vary considerably at any mine. Uncontaminated surface water usually is alkaline. But at any location where water percolates through a gob pile the sulphur compounds are likely to be leached out, making the water acid. Such water may require treatment to reduce its corrosive effect. One chemist with extensive experience says: "The wash-water supply requires constant policing to prevent dangerous acid conditions from getting the upper hand." His company uses lime to neutralize acidity and carries the pH up to 8 or 8½

Various other washing plants use lime or soda to neutralize wash water and carry the pH up to approximately 8. One mine having its own power plant and which treats boiler water with soda discharges the blowoff water into the washery settling pond. That helps keep the wash water in an alkaline condition. The erosion of plates, piping flumes and cones is bad enough from cutting by hard refuse without being accelerated by acid water.

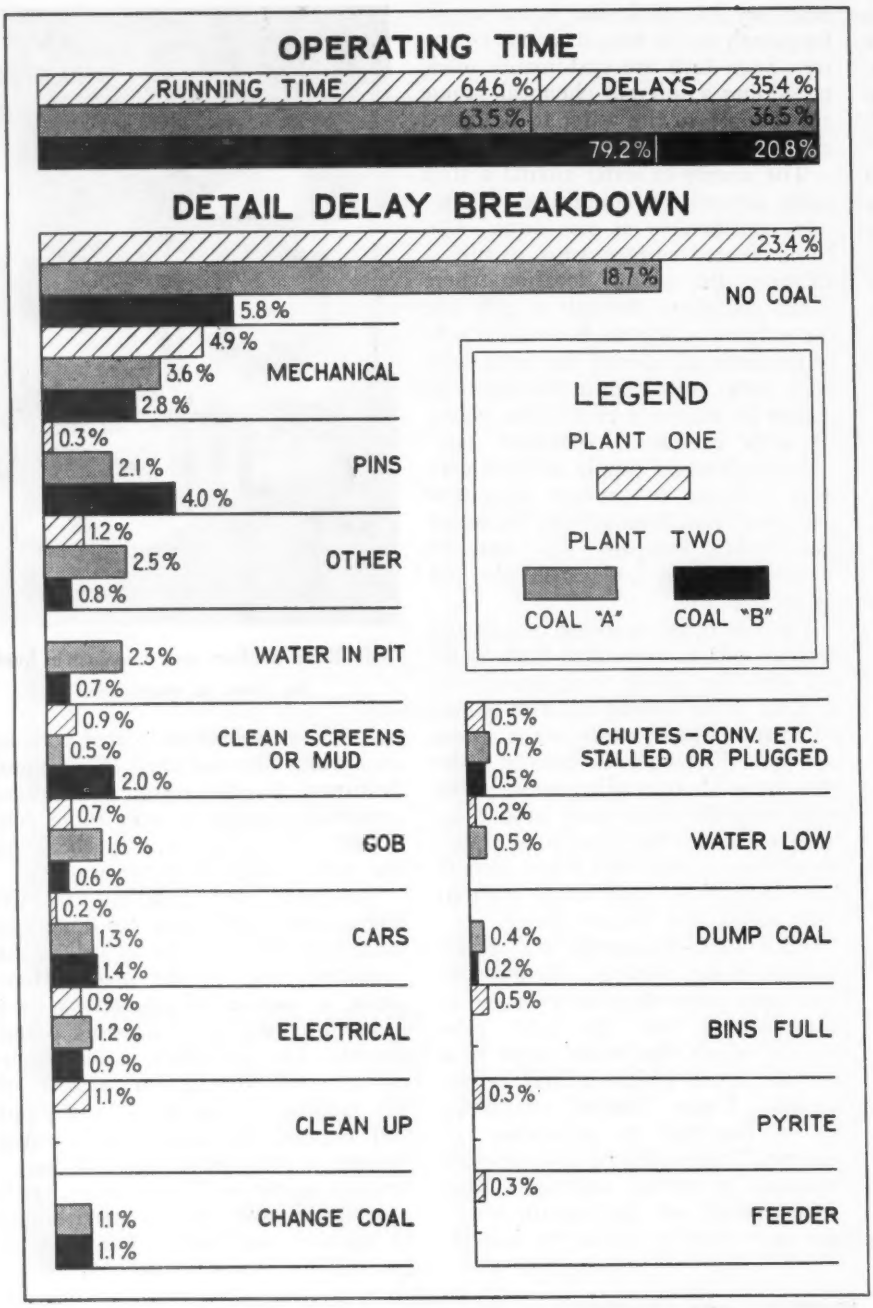
Wash water frequently is a serious problem in dry weather. To conserve the supply many strip mines flume or pump slurry into the spoil piles through which the water seeps to a reservoir, from which it may be recovered. Under normal conditions this is expected to neutralize, or "sweeten," the water by contact with limestone or earthy materials. One chemist points out that certain conditions may exist in which the individual rocks may become coated with an impervious film and their effectiveness destroyed. For this reason and because conditions around a strip mine continually change a running check on the water supply is necessary.



Tools have a place and time lost in hunting them is eliminated.

Provisions for handling maintenance work that must be done can materially affect its cost as well as the operating time of the plant. Here, again, a number of operations have found a system based on work orders helpful. The procedure in one washery is worth description because of the methodical way it is carried out and because the work orders issued become a permanent record of maintenance activities. This washer has a capacity of 8,000 tons in seven hours. It operates one shift. The mainte-

Recovering water from a spoil-bank reservoir. The character of such water should be regularly checked to avoid damage from acid conditions.



Graphic record of year's loss of time and the causes thereof. Monthly charts provide the basis for regular corrective steps.

nance crew of a foreman and three mechanics work the second-shift period. As at other washeries, idle days and Sundays sometimes have to be used to complete unusual jobs.

Unit Numbers Facilitate Repairs

The builders of this plant assigned numbers to machines and groups of equipment units for convenience in design and erection. These same numbers are used in work orders to designate the repairs to be made and for reference to the files. As the files grow it takes but a glance to see which equipment has required the most attention.

These work orders originate with the preparation engineer, washery foreman, shift bosses or the master mechanic. The work order names the equipment to be repaired, outlines the work to be done and is dated. Two copies are made, one for the maintenance men and one for the files. On the back is a space for listing the material used.

Copies for the maintenance foreman are posted on a bulletin board in order of importance, the most urgent at the top and lesser ones in order down the line. The work is done in that order except that jobs are not started near the end of the shift which cannot be completed. When the work is completed the foreman turns in his copy, showing material used and date completed. These completed work orders are the basis for reordering supplies and are filed as a permanent record for future study and estimate of the life of parts. In the course of time this file contains sufficient information to predict the life of the various parts and machines in the plant. This information is a warning as to when renewal parts must be available to forestall a shutdown.

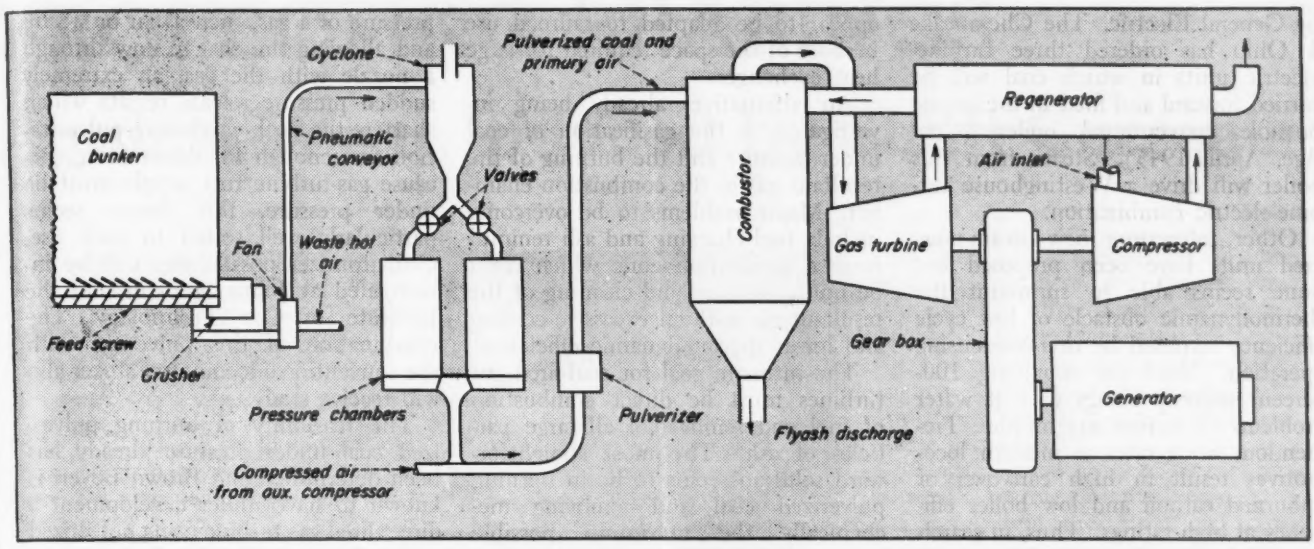
At this particular plant, in addition to inspection by operating and maintenance men, the preparation engineer makes a complete inspection at least once every day to check operation and to note anything going wrong. A good many preventive measures have been taken that cannot be classed as repairs. They are changes in construction designed to overcome defects in design or equipment or that suggest more satisfactory operation. Sketches of these changes are kept in the files for reference.

The operating record of this washer for 1944 indicates less than five percent lost time from all causes and under one percent for mechanical and electrical delays combined.

Charts Show Causes

The annual analysis of two coal-washing plants serving three strip pits in central Illinois is reproduced in an accompanying illustration. One plant handles coals from two different veins which are washed on different shifts, with separate records kept. These charts are made up monthly, the one shown being the combined reports for 1944. They provide an instantaneous comparison of the results from the three strip pits, telling the story visually and suggesting where unusual troubles may exist that may need more careful investigation. They are the basis for round-table discussion between executives and foremen to determine steps to be taken to remedy the causes. In addition to the bars, which are colored, the exact figures are written in to give the examiner complete information on changes from the previous month or year.

It will be noted there are two charts. The top chart gives the operating time, running time and delays to one scale. The lower chart divides the delays into 17 classes, laid out on a multiplied scale (2½ times) so that small percentages will cover enough space to be readily seen. One plant was built in 1933, the other some time later.



Coal into power via the gas turbine. This diagram shows how a coal-burning gas-turbine plant with coal atomizer might be set up.

THE GAS TURBINE:

Coal's New Railroad-Fuel Opportunity

Increased Availability and Higher Thermal Efficiency Make the Coal-Burning Gas Turbine the Logical Power for Locomotives—Direct Combustion and Pulverizing Technique Included in Research Objectives

By J. I. YELLOTT
Director of Research
Locomotive Development Committee
Bituminous Coal Research, Inc.

THE FUTURE of the combustion-gas turbine in stationary and railroad applications ties closely to its ability to use bituminous coal as fuel. Although lower in thermal efficiency at present temperatures than the diesel, the simple gas turbine with low-cost coal as fuel will compete with any oil-burning prime mover.

The economic future of eastern United States railroads also ties closely to continued large-scale use of coal, not only by industry and the nation as a whole but also by the roads themselves. Carrying coal is one of the railroads' most important tasks; 98 percent of the nation's coal moves by rail from the mines. Employment for hundreds of thousands of men in all activities from mining to locomotive firing depends upon continued use of coal in large quantities.

In search of improved motive power, American railroads have begun the most intensive program of research and development in the industry's history. Motivated not only by the need for locomotives of higher availability but also by deep interest in the continued use of coal for railroad purposes, officers of six major eastern roads and three large coal companies have associated themselves with Bituminous Coal Research, Inc., as the Locomotive Development Committee.

This group has as its responsibility the development of coal-burning locomotives of increased availability and higher thermal efficiency. After carefully considering available means for powering locomotives the committee decided to concentrate on the coal-burning gas turbine.

At present, the reciprocating engine still dominates the field and thousands of these units are hauling wartime loads with excellent records. Constant improvement in the conventional locomotive is being carried on by railroad and engine builders, but the reciprocating engine is rapidly approaching its ultimate in size and power while present methods of burning coal in locomotive fireboxes already have passed the point of maximum efficiency.

The steam turbine offers attractive possibilities for locomotive propulsion and a number of such units have been built abroad. During the past year, the Pennsylvania R.R. placed in service a geared-turbine unit built by Baldwin and Westinghouse (*Coal Age*, December, 1944). This marks a definite step forward but faces limitations imposed by difficulty in increasing steam-generating capacity beyond that of this new unit. The Pennsylvania also plans a new triplex locomotive (*Coal Age*, April, 1945) with two geared-turbine sets.

Turbine-electric drive also is being investigated vigorously. The railroads composing the Locomotive Development Committee, with three other large eastern lines, are financing the building of a turbine-electric giant in which a pulverized-coal-fired Babcock & Wilcox water-tube boiler will supply a turbine and electric drive to be built

by General Electric. The Chesapeake & Ohio has ordered three turbine-electric units in which coal will be carried forward and fired in the largest possible conventional boiler (Coal Age, April, 1945). Steam from this boiler will drive a Westinghouse turbine-electric combination.

Other interesting new steam-powered units have been proposed but none seems able to surmount the thermodynamic obstacle of low cycle efficiency imposed by non-condensing operation. Need for supplying 100-percent makeup brings with it water problems of serious magnitude. Tremendous firing rates in modern locomotives result in high carryover of unburned carbon and low boiler efficiency at high ratings. Thus, in search for an improved coal-burning locomotive, the committee, after surveying the entire field, has turned to the gas turbine as a probable solution.

The record made by gas turbines used since 1936 in Houdry oil-refining units indicates that the turbine-compressor combination proves entirely satisfactory as far as reliability is concerned. A. E. Pew Jr. reported recently that six such units have shown better than 98 percent availability over a total of more than 25 years of operation and the newest unit has run over 600 days without a turbine interruption. These machines operate at about 900 deg. F., but tremendous wartime advances in metallurgy lead to the conclusion that a gas turbine operating at a maximum temperature of 1,200 deg. F. will be feasible.

Gas-turbine-cycle thermal efficiency proves far superior to the conventional non-condensing steam cycle because, using only a single regenerator, an efficiency of 25 percent can be reached with a 5 to 1 pressure ratio and a temperature of 1,200 deg. F. Including electric-drive losses, it still is reasonably safe to assume a maximum over-all efficiency of at least 15 percent. Thus, the gas turbine, even in its present state of development, should be able to begin at a point just beyond the reach of the best possible steam-locomotive propulsion system. Major turbine manufacturers are confident that as soon as wartime restrictions are relaxed gas-turbines for locomotives can be produced.

The obvious problem facing a prospective designer of a gas-turbine locomotive is the combustion of coal in a limited space and the removal of enough ash from the combustion products to insure reasonable turbine-blade life. Three possibilities present themselves. The closed-cycle design, as developed by Esher Wyss, is suitable for pulverized coal but does not appear to be adapted to railroad use because of the space required for large heat exchangers.

An alternative, already being investigated, is the gasification of coal under pressure and the burning of the resultant gas in the combustion chamber. Major problems to be overcome include fuel charging and ash removal from a gasification zone which must be under pressure and cleaning of the resultant gas without excessive cooling and lower thermo-dynamic efficiency.

The ultimate goal for coal-fired gas turbines must be direct combustion of fuel and removal of all large particles of ash. The most straightforward solution seems to lie in burning pulverized coal and removing mechanically the maximum possible quantity of flyash. The research program of the Locomotive Development Committee therefore aims at this goal. Three major lines of attack will be followed in work at Johns Hopkins University, Battelle Memorial Institute and the Institute of Gas Technology. Problems of pulverization, combustion and ash removal will be studied by these three organizations in a coordinated program to be financed and directed by the Locomotive Development Committee.

In addition to various well-known pulverizing methods the "coal atomizer," developed at the Institute of Gas Technology, will be studied vigorously to learn whether this extremely simple device is adapted to use with compressed air for gas-turbine service. The coal atomizer represents a continuous explosion system by which crushed coal can be reduced to a size suitable for boiler firing in one pass through a light apparatus that involves no moving parts.

By subjecting the crushed coal to pressure of a gas, such as air or steam, and allowing the coal to flow through a nozzle with the gas, an extremely sudden pressure release results which shatters the coal, producing pulverization fine enough for direct firing. Because gas-turbine fuel supply must be under pressure, this device seems particularly well suited to such use. Coal-atomizer possibilities will be investigated at Johns Hopkins and the Institute of Gas Technology. The combination of this pulverizer with the conventional locomotive stoker also will receive study.

The feasibility of burning pulverized coal under pressure already has been determined and Brown Boveri is known to have under development a direct-fired gas turbine using pulverized coal. Little is known, however, of the fundamental principles involved in burning coal under a pressure of about 60 lb. per square inch, and work will be undertaken at Battelle, under the direction of Ralph Sherman, on development of a suitable combustion chamber. In addition, the Vortex combination chamber, developed by the British Fuel Research Station, will be adapted to gas-turbine requirements in an investigation to be carried out at Johns Hopkins under the direction of Dr. A. G. Christie. It has been reported that Vortex combustion chambers have attained a heat liberation of 500,000 B.t.u. per cubic foot per hour using pulverized coal at atmospheric pressure. It is hoped that with a pressure of four atmospheres a much higher rate can be reached.

Removal of flyash is an essential requirement for gas-turbine service and an attempt will be made to combine the combustion chamber with a cyclone to remove large flyash particles. Extensive work also will be undertaken to determine allowable dust loading for turbine service both as to maximum particle size and total weight of solids per cubic foot of flue gas. Since maximum outlet gas temperature from the combustion chamber will not exceed 1,200 deg. F., there should be no question of slag formation and, with 400 percent excess air available, there will be no smoke from the coal-burning gas-turbine plant. It is believed that the coal-burning gas turbine is destined to become an extremely important prime mover in the moderate-sized range and its suitability for locomotive requirements appears to be so excellent that a direct and vigorous attack will be made by the Locomotive Development Committee upon the problems which must be solved before bituminous coal becomes a standard fuel for gas turbines.

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PROTECTING BEARINGS
Against Wear Induced by Shaft Currents

By D. B. HOOVER
Electrical Design Engineer,
D.C. Engineering Dept.
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East Pittsburgh, Pa.

SHAFT CURRENTS in motors and generators may cause excessive bearing wear and resultant failure. In most cases current present in the shaft must cross the bearing oil film and flow into the bearing shell. This action pits the bearing surface and often the shaft, causing bearing wear and frequently bearing wiping. The rate of bearing wear may be rapid, causing failure in days, or it may be slower, with failure after a long period of operation. Bearing wear is accelerated if the current is large and the loading great.

The surface of a bearing affected by currents is covered with fine pit marks. These pits often are found in bands around the bearing surface, and if the current is severe the shaft itself will show pitting.

A simple method of determining the presence of bearing currents is to attach a short, heavy cable to the bearing bracket or pedestal and then touch the other end of the cable to the rotating shaft, as illustrated in Fig. 1. Persistent electrical sparks between the shaft and cable end indicate that bearing currents are possible. However, this test in itself will not show if there are currents sufficient to damage the bearing. Nevertheless, if the bearing surface has a pitted appearance and if sparks are present between the shaft and cable, it is nearly certain that damaging bearing currents exist.

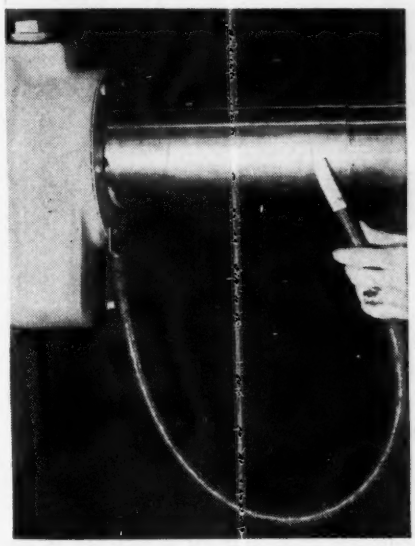

Fig. 1—Bearing currents can be detected by holding a cable with one end fastened to the bearing housing against the shaft. Sparks at contact point indicate the possibility of bearing currents.

Bearing currents may be either direct or alternating, depending on their cause. Magnetic dissymmetry of a machine will cause an a.c. voltage to be generated in the shaft. This voltage will tend to circulate current through the shaft, across the bearing oil film, through the base and thence back through the other bearing, as shown in Fig. 2. Bearing currents of this type may be present even in a perfectly designed machine, since manufacturing variations may introduce slight magnetic dissymmetry.

Magnetization of the shaft may produce d.c. bearing currents. The method of connecting the series and commutating fields may produce a magnetizing effect in the shaft if the load current is allowed to make an uncompensated turn around the shaft. It is possible by proper connection to reduce the shaft magnetization to a small value. Where present, the magnetizing effect will cause magnetic flux to pass along the shaft, across the bearing oil film, through the base and thence back through the other bearing. The flux set up by the magnetizing force generates a homopolar d.c. voltage in the shaft along the bearing. This voltage, if sufficiently large, causes direct currents to circulate from the shaft through the bearing and back to the shaft. In other words, this bearing current circulates locally within the bearing, as shown in Fig. 3, and does not flow the entire length of shaft.

A.c. bearing currents may be eliminated best by insulating one bearing, including holding down bolts, dowels, oil piping and grounded connections. This insulation will break the path of the current and no further bearing cur-

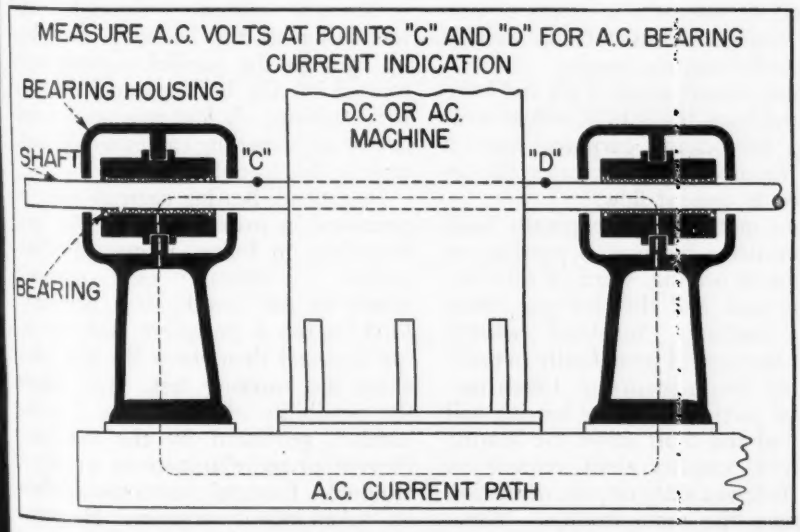

Fig. 2—Path of a.c. currents produced by magnetic dissymmetry.

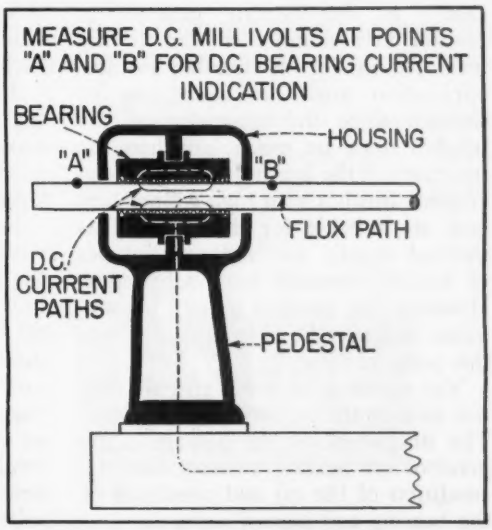

Fig. 3—Path of d.c. shaft currents from shaft magnetization.

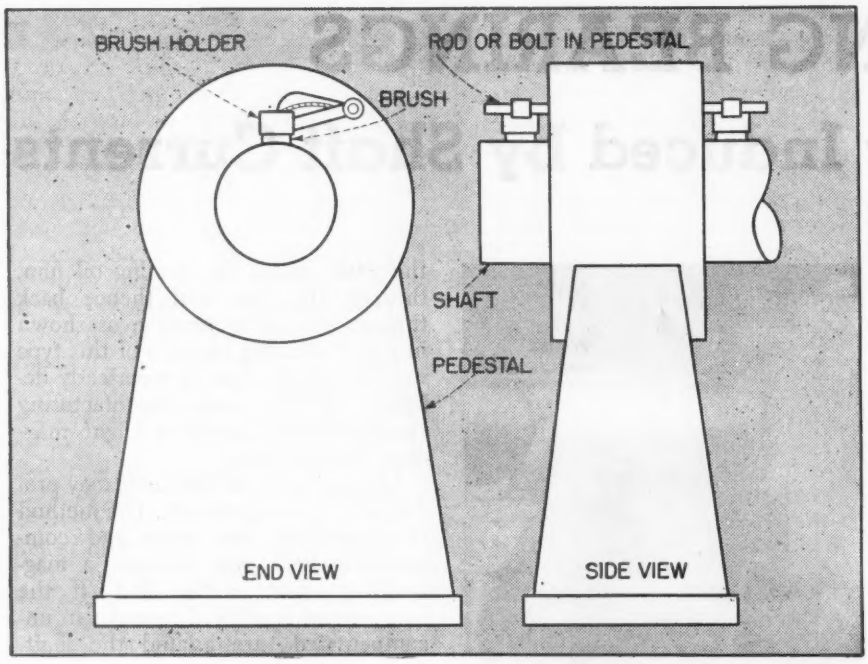

Fig. 4—A.c. or d.c. bearing currents may be reduced to harmless values by shunting them out of the shaft with brushes attached to the bearing housing and riding on the shaft.

rent is possible if the insulation is kept clean and in good condition.

D.c. bearing currents may be eliminated best by reducing the magnetizing force around the shaft. It is recommended that the manufacturer ot the machine be consulted in this case. Bearing insulation will reduce the flux and thereby reduce the internal circulating bearing currents. The reduction gained this way often is enough to eliminate bearing damage.

Shunting Reduces Currents

Both a.c. and d.c. bearing currents may be reduced by shunting most of the current out of the bearing. This may be accomplished by adding brushholders (with brushes that ride on the shaft) to the bearing pedestal or bracket in a manner similar to that indicated in Fig. 4. Brushes for this application must have very low resistance since the resistance of the brushes must be much less than the resistance of the bearing oil film. Metal graphite brushes with high copper content are suitable for this use. This method usually will reduce all types of bearing currents to a safe value. However, the brushes require maintenance and may be objectionable from this point of view.

The presence of some current may not damage the bearings of a machine. The magnitude of the damage is dependent on bearing current, loading, condition of the oil and condition of the bearing and journal surfaces.

The voltage measured across the shaft on each side of a bearing is an indication of possible d.c. bearing currents. Usually, a voltage of 150 millivolts (measured with a d.c. millivolt meter) will not circulate currents of sufficient magnitude to cause damage in a sleeve bearing. If an a.c. voltage is present across the shaft of a machine (from a point on each side of the rotor on the shaft inside of each bearing pedestal or bracket) it is evidence that some a.c. shaft current may be present. However, it is not possible to take reliable electrical readings of the magnitudes of bearing currents and voltages with ordinary instruments. An oscillograph will give much better results when used with the proper shunts and elements. Even if reliable readings are taken they are difficult to interpret in terms of possible damage because of the variable factors affecting the results.

Proper maintenance of oil and bearing conditions tends to eliminate wear caused by bearing currents, since a good, clean oil film increases the resistance to current flow.

Some machines are originally built with insulated bearings, depending on the type of bearing, speed of rotation, bearing load and the size and rating of the machine. Insulated bearings should be checked periodically to make sure that they remain so. Often mechanical parts close to the bearing will be moved and short across the bearing insulation, causing shaft current to flow. Likewise dirty or poor insulation will cause the same trouble. These points can be checked readily at each inspection. It is wise to consult the manufacturer where serious shaft currents are encountered, as he is better able to make recommendations on how a bearing should be insulated or what other steps should be taken to eliminate the trouble.

Sleeve Bearings Less Affected

Roller or ball bearings are more likely to be affected by bearing currents and abnormal heating than sleeve-type bearings, as the contact between the bearing and the shaft is extremely good. Good contact will allow more current to flow through a given bearing with the same bearing voltage. Also the high-speed rollers or balls in the bearing will cut any flux passing from the shaft to the bearing at a high rate. This induces bearing currents within the balls or rollers themselves, causing overheating. Therefore, the amount of shaft current or flux must be smaller for roller- or ball-bearing operation than sleeve bearing.

There have been a few cases of bearing currents from an external source. Widely spaced buses carrying large currents can set up a strong magnetic field which may cut the shaft and thereby induce a voltage. This in turn can generate bearing currents. Closely spaced transposed buses will cure this condition. However, it may be necessary to demagnetize the shaft and surrounding structures when the new bus is installed to eliminate the effects of old residual magnetism. Shunting brushes, mentioned above, will help prevent damaging currents in the bearings.

A grounded coil on the rotor of a machine may cause current to flow through a bearing. Periodic insulation resistance readings on each machine would detect this condition, possibly before any damage occurs.

Ground currents through the foundation of the building may flow up through the parallel current path formed by the bearings and shaft of the machine. A low resistance foundation or grounding cables would help remedy this trouble.

In general, bearing currents may be generated by many sources. The best procedure to follow is one of elimination. Eliminate each possible source as the investigation proceeds. First, make a complete bearing inspection and then check the machine, using the sparking test. Investigate the possibility of a.c. or d.c. bearing currents generated by the machines themselves and eliminate or remedy if required. External causes should then be looked into if necessary. However, this type of trouble is rare.

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Using Bad Air of an Old Goaf To Extinguish Fire in Nearby Working

Characteristics of Through, or "Cross-Lots," and Replenishing, or "Tidal," Air Currents—Piping Noxious Air From Donor to Donee Goafs to Fill Voids and Complete Suffocation of Fire

IN THE forerunning third article* on the handling of mine fires it was suggested that the problem of meeting the low pressure created by the cooling of the fire could best be solved by introducing a gassy medium, preferably not combustible or explosive, into the distant edge of the inclosed area, so as to provide the requisite back pressure at points in the vicinity of the combustion and thus to prevent air from entering so near the fire that it would be drawn into it, taking care at the same time to provide that the air entering away from the fire should not both enter and leave the inclosure because of any difference in pressure between the entering atmosphere and the atmosphere surrounding the fire area. Such air entering through supposedly tight stoppings, pillars, roofs or floors, and leaving promptly by similar means of egress was dubbed "cross-lots ventilation."

Cross-Lots Vs. Tidal Air

One of the values of tight stoppings is the protection they afford against "cross-lots ventilation" (see Fig. 1) because such ventilation creates a channel or channels through the air in the inclosure that may well pass to and through the fire, seeing that the quantity, given enough time, might be almost infinite and will help to sweep out inert air even if, when passing across the inclosure, it should do so beyond the zone of disturbance. Cross-lots ventilation is harmful even if it does not pass to the fire. It replaces inert air with fresh air.

"Tidal" air sets toward its invisible but quite definite "shore" with much greater force than cross-lots air, but, for all its irresistibility it never can reach the fire because it is a "current of limited objective" and merely creates a vacancy for itself by compressing the air ahead until it is equalized to atmospheric pressure. It is faced with a counter pressure bound eventually to equal its own. Water compresses very little with pressure, but the tidal air thus entering the inclosure can be compared, with some reservations, nevertheless, to water passed in a matter of days or months into a drinking glass filled partly with other water at the same temperature. The added water goes to the "water level" of the liquid in the lower part of the glass and no farther, except by diffusion.

This tidal air is not so distressing as air that reaches the fire and passes for an objective beyond it and continues to travel until it reaches the surface through shaft, slope or drift. The latter might be described as a "current of unlimited objective." Yet, the pressure of such a current is small compared with the pressure of a tidal current which, if its passage is absolutely barred, becomes stronger and stronger as time passes until the actuating influence ceases.

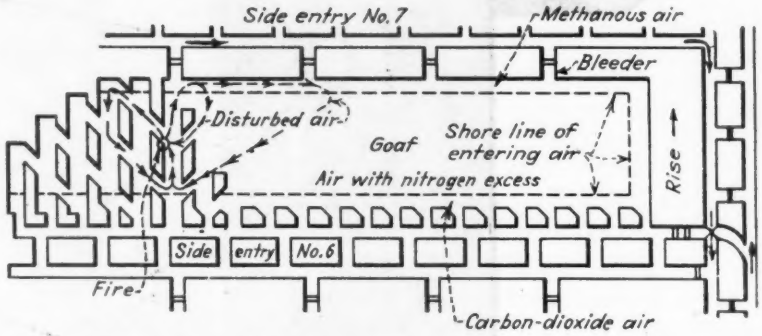


Fig. 2—Shows the shore line of the entering air when no provision has been made for its admission. This certain quantity of air, however, laughing at locksmiths, gets in inexorably by a multitude of ways, through stoppings, pillars, roof and floor, all along the periphery of the sealed area.

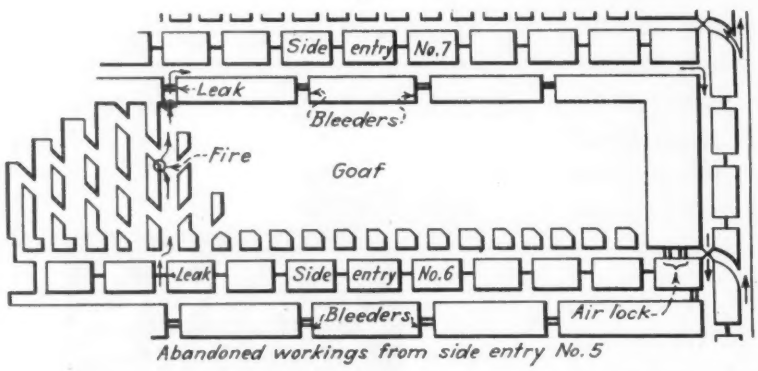
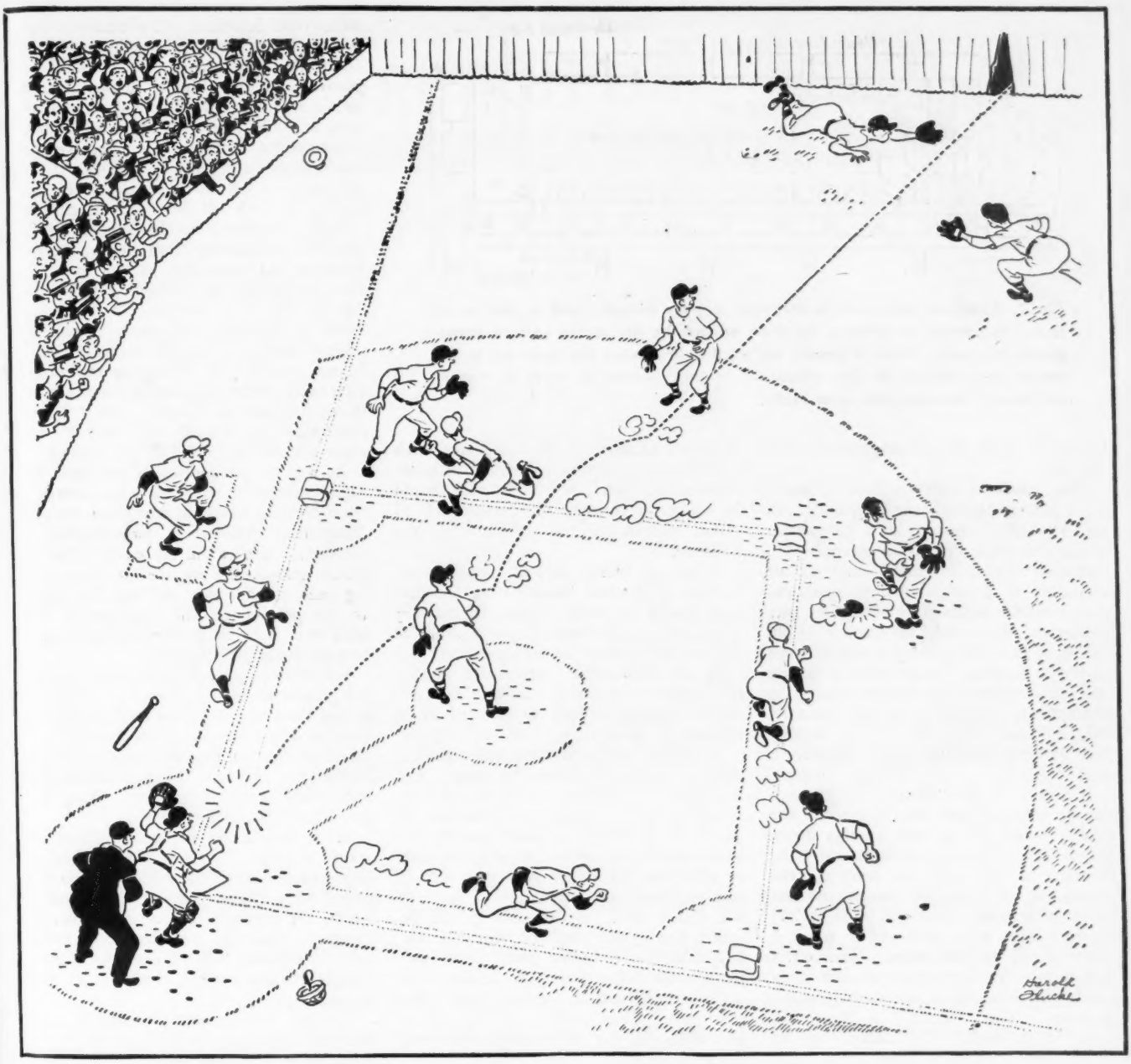


Fig. 1—Cross-lots ventilation—not forceful but unlimited in volume, given enough time. It may or may not go to the fire, but, in any event, if it gets into the sealed area, it will replace foul by fresh air and its results will be evil.

Divert, Not Stop, Tide

Accordingly good stoppings near the fire may be reasonably effective against cross-lots currents, but against tides they cannot wholly prevail, but, though they fail, they may be helpful still, for the resistance which these better stoppings apparently ineffectively exert give time to the more remote air to push its way in; thus the pressures of the sealed area are restored and

* See February, 1945, *Coal Age*, p. 124; May, p. 114; July, p. 112.



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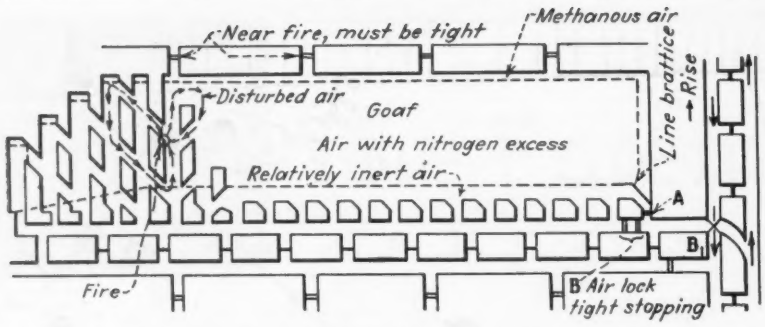

Fig. 3—Admission port at *A* is arranged to pass enough fresh or foul air in or out as needed to maintain the area around the fire at the surface atmospheric pressure. When it passes air in, the air pushes the inert air in the sealed area toward the fire, which air, in turn, blocks the entry of fresher air through bleeders and room necks.

the day is saved for the stoppings around the fire.

This remote air enters without channeling a passage through the impounded air and acts like a piston in a compressor which also goes forward in an unbroken mass and travels inexorably and almost irresistibly to a certain definite goal and then suddenly ceases its motion and goes no farther. When tidal air reaches its objective, it (like the piston) ceases to press on the air beyond. Unless there is further cooling, circulatory movement, change in atmospheric pressure or in fan pressure, only diffusion will carry the air beyond that limiting shore line, and diffusion is slow.

If the air in the inclosure remote from the fire is full of inert gas, the entry of the tidal air back of it, even though fresh, may be helpful. Air is going to enter the inclosure in any event, so don't try the impossible. It is best to compromise and let it in or some other gas, such as bad air from some other goaf, and to admit it where it can do least harm. Even water may be used to restore pressure lost when the fire cools or the atmospheric pressure increases. The "vacuum" is there and must be satisfied. The leakage can be slowed and diverted to some other place, but not entirely suppressed.

This admission of air, if made at a point where the outby air pressure exceeds or is lower than the inby air pressure at any other point in the external periphery of the sealed area, might start extensive cross-lots ventilation, so barometer readings should be taken to ascertain whether, at points adjacent to the sealed area, such a difference of pressure exists. If such differences are found, as is likely, care should be taken to equalize the pressure of all points exterior to the periphery of the inclosure.

When air that is able to support combustion is admitted remote from the fire, care should be taken to keep its pressure as near as possible equal to the pressure of the air environing the inclosure, so that such air deliberately introduced should not travel "across lots." It should be admitted through a valve so adjusted as to regulate its pressure.

If the bad air from some other goaf, a "donor" goaf, is chosen to supply the atmospheric depression in the sealed area, it will be well to arrange that the loss of gas in this goaf shall be made good by the admission of good or foul air at its far end, or otherwise the donor goaf may receive and pass fresh air, and not foul air, into the sealed area. Both goafs should be sealed, the "donor goaf" perhaps less carefully than the "reception goaf." The stoppings in the donor goaf might be described as "diversion brattices" rather than "pressure seals." They merely tell the air to go a different way to accomplish its purposes.

Should the fire unfortunately recover, the foul air from the reception goaf would be paid back to the donor goaf, and there stored for further use as soon as the fire again dies down. Sometimes there may be a series of older and older donor goafs, with fouler and fouler breath and larger and larger capacity for supplying foul air (see Fig. 4, where the donor goaf is fed from another goaf presumably larger and connected with acres of extractive operations).

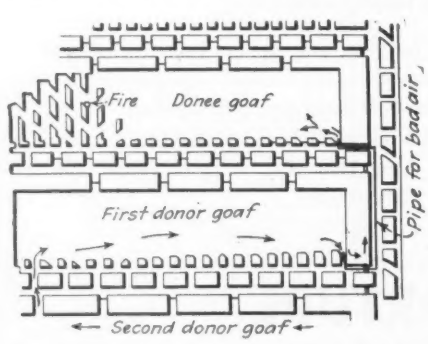

Fig. 4—Showing how air can be brought from donor to reception goaf so as to maintain pressure, and still have inert air.

Deflagrating Vs. Detonating Explosives

Because black blasting powder, the explosive that probably first comes to mind when deflagrating explosives are discussed, consists of charcoal, a nitrate and sulphur, it is natural for the layman to believe that the relative slowness in action of all such explosives is due to their being mixtures rather than single chemical compounds. However, smokeless powder also deflagrates rather than detonates, yet it need not contain any but one material—cellulose nitrate.

On the other hand, the chlorate explosives and many similar detonating materials are mixtures of several substances, none of which is in itself explosive. Hence, a deflagrating explosive is not necessarily a mixture, and a detonating explosive is not necessarily a self-contained explosive or a mixture of such self-contained ingredients.

Two fundamental characteristics distinguish deflagrating from detonating explosives: (1) speed of reaction and (2) the manner, or, as chemists put it, the "mechanism," of reaction. First, as to speed of reaction, deflagrating explosives seldom develop a speed in excess of 3,000 ft. per second, but detonating explosives, such as dynamite, will average about 12,000 ft. per second, and certain other types, principally for military use, may almost reach a speed of 25,000 ft. per second.

As regards mechanism of reaction, deflagration may be regarded as an extremely rapid burning which in any given type of deflagrating explosive is proportional to the surface area of the explosive. The explosive granules are prepared in many varying sizes, so that they will suit the speed of the powder to the character of the work that is to be performed, fine grains burning faster than larger.

For a like purpose, large grains of smokeless powder are provided with perforations, so that the grains will burn both inside and outside, thus increasing the surface exposed as the burning progresses, thereby tending to maintain the pressure as the bullet they are ejecting travels along the gun barrel toward the muzzle.

With detonating explosives, considerations of surface area are of little relative importance, because the explosion is in the nature of a "chain" reaction. In other words, the explosion of one molecule, or group of molecules, causes adjacent molecules to explode, and the explosion travels straight through, rather than around, the grains.

Perhaps, in comment, it may be said that the opposing mechanisms might be colloquially described therefore as respectively "burn" and "bust," with the deflagrating explosives mainly burning their way forward and the detonating explosives so delivering shock waves to the several molecules that they rearrange their constituent atoms without waiting to be subjected to heat.

Choice and Cleaning Of Mine-Water Pipes

For mine drainage and pumping it is well always to select pipes of diameters exceeding those actually needed because, with lower speed, there will be less friction and because it is best when cleaning pipes to leave a little crust, say ¼ in. thick, all around the interior of the pipe to prevent further deterioration. Pipes should thus be cleaned at least once a year. Where the speed of the water is excessive, it may scour its own channel and when that occurs the corrosion will be even more marked, new surfaces being brought in contact with the acid water.

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State-Board Questions

Mine Foremen, Alabama

Drawing Teeth From Methane

Q.—In a return airway, 80,000 cu.ft. of air is traveling, and it is found to contain 0.65 of 1 percent of methane. What quantity of air will have to be added to reduce the methane content to 0.4 of 1 percent?

A.—When it is stated that there is 0.65 of 1 percent of methane in a mine atmosphere, that is only another way of saying that there is 65 hundredths part of methane in every 100 parts of the mine atmosphere or $\frac{65}{100 \times 100}$ parts of methane for every one part of mine atmosphere. Because in the question the quantity of air traveling is 80,000 cu.ft., there must be

$$\frac{65 \times 80{,}000}{100 \times 100} \text{ cu.ft.} = \frac{65 \times 80{,}000}{10{,}000}$$

which equals 65×8, for you can cancel the four ciphers in the numerator and the four ciphers in the denominator without in any way changing the value of the expression. As $65 \times 8 = 520$, the quantity of methane will be 520 cu.ft. in 80,000 cu.ft. of mine atmosphere when it contains 0.65 percent of methane.

To meet the other condition of the question, these 520 cu.ft. of methane have to be so diluted with pure air that they will contain only 0.40 of 1 percent or 40 hundredths of 100 parts, or $\frac{40}{100 \times 100}$ of one part. We want to know how much air will be present for each cubic foot of methane when the percentage of methane is 0.4. That is obtained by comparing 100 with 0.4. As $100/0.4 = 250$ you have 250 cu.ft. of return air for every cubic foot of methane. But you have 520 cu.ft. of methane. So you multiply 250 by 520 to get the cubic feet of return air that will carry 520 cu.ft. of methane and yet have only 0.4 of 1 percent of methane. This equals 130,000 cu.ft. So the increase is $130{,}000 - 80{,}000 = 50{,}000$ cu.ft. This is the longer explanatory method.

An Easier Way

A shorter way but less explanatory is comparing the percentages. One mixture has 0.65, the other 0.4 percent, but both are required to carry the same volume of methane. As the percentages of methane will be as $0.65/0.40 = 1.625$, the quantities of return air with only 0.4 percent of methane will be $1.625 \times 80{,}000 = 130{,}000$. So the increase will be calculated, as before, as 50,000 cu.ft.

Air Under Bad Roof

Q.—If the velocity of air is 575 ft. per minute, what is the volume of air traveling in an airway that is 6 ft. wide at the top, 8 ft. wide at the bottom with an average height of 6 ft?

A.—As the sides are regular, an average of width is something on which one can rely. The average width is width at top plus width at bottom divided by $2 = (6 + 8) \div 2 = 7$ ft. On the other hand, the average *height* means next to nothing, because if the height is 5 ft. in one place and 7 ft. at another point nearby, as it often is, the average will be 6 ft., but the height above 5 ft. will add little capacity to the roadway, as the air will be little disposed to use it for forward travel. It may swirl around in the additional space, but this part of the cross-section will do more harm than good.

It would be best to estimate the height as 5 ft. and the width as 7 ft. and the area 5×7 ft. or 35 sq.ft. As through each square foot of cross-section passes every minute a block of air 575 ft. long, through a cross-sectional area of 35 sq.ft. will pass 575×35 cu.ft. per minute $=$ 20,125 cu.ft. per minute.

However, if the roof is fairly even and changes its height slowly and without offsets, the available and useful cross-section will be 6×7 instead of 5×7 sq.ft. $=$ 42 sq.ft., and the air passed per minute will be 24,150 cu.ft. per minute.

Mine Foremen, West Virginia

Bad Haulage Practices

Q—List some unsafe haulage practices (continued).

A—Bad haulage practices already described (July, pp. 116-118) were flying switches, pushing trips, riding pushed trips, running ahead of a trip to throw switches or open doors, riding on a locomotive, climbing or jumping from car to car and riding between cars.

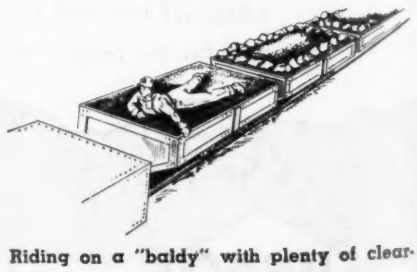
(8) *Jumping On and Off Running Trips and Running Alongside Moving Cars*—It frequently happens that the person so doing slips sidewise and falls toward the trip. In running, he may land his foot on a chunk of coal, which will roll away from under it and throw him. Sometimes obstacles that should not be present bar his passage and complicate the situation.

(9) *Overbalancing Cars*—By an improper locating of men on the flaring sides instead of the bottoms, of empty cars or on their ends when the wheel base is short, as it usually is, the cars may tip and become derailed. But short of an actual tilting of the car body, the car will run more true to the rails and hence more safety when it carries a well-balanced load. This applies particularly to empty cars with excessive flare, light construction and short wheel gage.

Riding on the Coal Load

(10) *Sitting Up Too High in Car or Riding on the Coal Load*—If there is no thin coal or low crossbars, or if the coal is of considerable thickness, this would be a harmless performance, except that the man may lose his hold while traveling on top of the coal in the car or may be dislodged if chunks of coal break loose and fall onto the side of the roadway. In many cases, men make an even bed for themselves in the coal, but even then, if the coal is low, they may "roof" or even be crushed if the car tilts up or the roof is too low.

But, if there is plenty of height above the car sides and ends, the miners will build up, or "top," the load above the sides, and men riding such a load may be thrown to the track when the load shifts. Only the triprider should ride a loaded car, and he should choose a suitable "baldy" slack-filled car, smoothing any inequalities on its surface. Tripriders would be accommodated if "baldies" could be provided in most trips. Riding a "baldy"

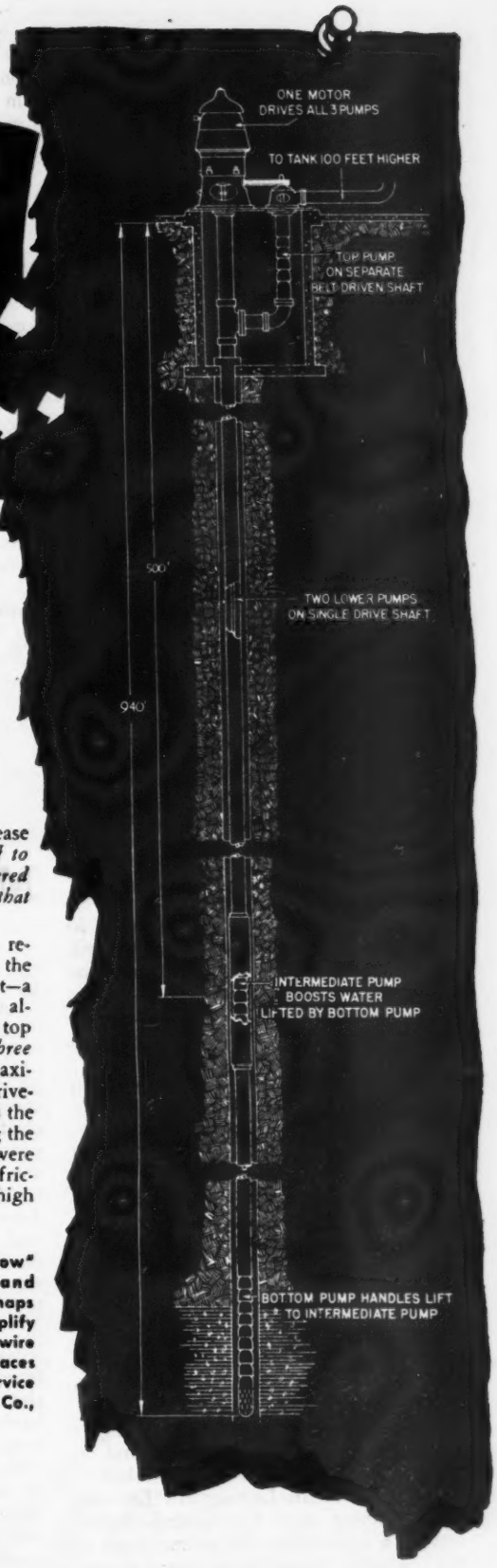


Riding on a "baldy" with plenty of clearance from coal to roof.

Another page from the widespread experience of Fairbanks-Morse pump engineers!

HOW 3 PUMPS 2 SHAFTS 1 MOTOR

were UNITIZED to solve a tough military problem!



IMAGINE the hydraulic skill necessary to combine an integral electric drive, a belt drive, 3 pumps totaling 59 stages and 890 ft. of column pipe and shafting into one smooth-running pumping unit . . . and at the same time solve one of the toughest lubrication problems ever put to a pump manufacturer!

Yet that's exactly what Fairbanks-Morse Pomona engineers did to meet an urgent water problem at a vital military base in the Pacific war zone. And even that is only part of the story, for the bottom pump on this installation is located *almost a thousand feet* through flint-hard rock from the motor that drives it . . . and the unit had to deliver 275 gallons per minute into a tank another 100 feet above the motor. That's an engineering job PLUS!

The situation...

A large dependable water supply was needed at this base. To reach it almost a thousand feet of hole had to be drilled vertically through flint-hard volcanic rock—rock so hard the hole had to be kept as small as possible to make the job feasible. Yet the great depth of the well called for a man-sized pump to go into that hole—enough pump to lift the weight of a thousand foot column of water at a rate of 275 gallons each minute!

How it was solved...

After studying the job, Fairbanks-Morse Pomona engineers decided on a 59-stage vertical turbine pump to meet the hydraulic requirements. But instead of putting this one large pump at the bottom of the hole, it was divided into three smaller units—one at the bottom (some 940 ft. deep), another midway, and the third at the surface. By thus dividing the job, size of the drive shaft and column pipe was substantially reduced because only a portion of the total power required for the pumps now had to be transmitted the full depth of the hole.

Then these engineers pulled another trick from the hat. To further reduce loads on the main shaft and also increase flow clearances, *the top pump was set off to one side on its own drive shaft and powered by a belt drive from the* same *motor that handles the other two pumps!*

Many important advantages resulted from this unique solution. First, the small hole requirements were fully met—a notable achievement in itself. Second, although almost a thousand feet separate top and bottom units, ONE motor drives *all three* units for synchronized operation and maximum ease of control. Third, since drive-shaft power losses vary approximately as the *square* of the shaft diameter, by reducing the shaft size very important power savings were effected, thrust bearing loads reduced, friction losses minimized and unusually high overall efficiencies achieved!

This is typical of the engineering "know how" that goes into all Fairbanks-Morse and Pomona Turbine Pump installations. Perhaps this unusual pump knowledge can simplify your water-moving problems. A letter, wire or phone call to your nearby distributor places this widespread experience at your service without obligation. Fairbanks, Morse & Co., Chicago 5, Illinois.

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when the clearance is adequate is not an unsafe practice.

Electrocutions

(11) *Leaving the Car on the Trolley-Wire Side*—Climbing over the side of the car on the trolley-wire side, contact may be made with the trolley wire and an electrocution result.

(12) *Coupling Cars When They Are Moving*, or on a curve, especially on the inside of a curve, or putting a foot on the rail when stooping over to put in the coupling pin. Should the cars be bumped, the coupler's body may be struck by the bar knocking him off his feet or his foot may be crushed by a wheel.

(13) *Putting Improperly Secured or Shifting Loads on Cars*, especially on car nearest locomotive. Such loads may fall on the motorman. Also overloading cars, especially on steep or "momentum gradients," where cars traveling downhill at speed are suddenly checked by a rising gradient. Coal, props, timbers and rails under such conditions will shift. Extreme care should be taken with loads that extend over more than a single car, especially where there are curves. Such materials should be transported on the "graveyard shift." When such long material has to be moved, it should be preceded by two or three empty cars between the load and locomotive so as to protect the motorman.

Don't Mix Tools and Men

(14) *Placing Tools and Explosives in Cars Transporting Men*—Tools that will fit in the length of a mine car may be carried in man-trips, but no explosives should be thus carried. However, the tools must not be placed in the same car as carries men.

(15) *Running Trips Too Close to Each Other*—Trips should be spaced at 500-ft. intervals.

(16) *Excessive speed* should be avoided where doors, sharp curves or sudden changes in gradient (humps or hollows) are located.

(17) *Riding on bumpers* on the end of the car which at the moment is on the forward end of the trip or riding on the side of the heading along which the trolley wire is stretched should be prohibited to all persons, even to those operating the trip. Tripriders should ride on the front or rear end of the trip.

(18) *Running Trips Without Lights Affixed to the Tail End of a Trip and on the Front End of Cars Being Pushed.*

(19) *Motorman Leaving His Locomotive Running and Unattended*—Before leaving a locomotive the reverse lever of the controller should be positioned at neutral and brakes set tightly. If the lever is removable, the motorman should carry it with him, lest unauthorized persons attempt to operate the locomotive or throw the lever without entering the cab.

(20) *Backpoling*—Only where the trolley pole cannot be reversed and only when the locomotive is run at slow speed should backpoling be permitted and then only for a short distance. With backpoling, the trolley may leave the wire and dislodge a timber or the violence consequent on the freeing of the pole may result in its being broken. Either the timber or the broken pole may injure the motorman in its fall.

(21) *Leaving Cars and Trips Where Collisions With Other Cars or Trips May Occur.*

(22) *Not Protecting Cars and Trips by Derails and Dogs Where Cars Are Dropped Down Slopes or Planes*

(23) *Failing to Set Brakes and Place Stop Blocks Where Trip or Cars Are Left on Gradients.*

(24) *Riding Bottom-Dump Cars.*

(25) *Wearing Clothes That Car and Locomotive Parts May Catch, Dragging the Wearer With Them*—The cables of electric cap lamps always should be carried beneath the wearer's buttoned jacket, and clothes should be tight-fitting with trouser legs in boots or puttees or otherwise held snugly to the lines of the body.

(26) *Hauling Men on Ascending Gradients in Man Cars Behind Loaded Trips or in Front of Loaded Trips Where Gradient Descends*—This applies where the inclination exceeds 3 percent. Lesser gradients can be corrected by the brakes on the locomotive.

(27) *Lack of Suitable Rerailers, Jacks and Other Appropriate Tools for Replacing Derailed Cars and Locomotives on Rails*—Short pieces of rail, ties and props are not to be regarded as suitable slueing material.

(28) *Sliding a Nip Along the Trolley Wire*, usually creates electric arcs which may ignite methane, injure the eyes of the man holding the nip, damage the trolley wire and also the fingers and segments in the controller. Cables or nips may become entangled and severed and so may injure the men by whom they are held, especially if wire, timbers or mine roof should, in nipping, become dislodged.

Accidents occur mostly in trip assemblage, not in bona-fide transportation. In straightforward travel, few accidents occur if the track is good and the roof is well supported. On a straight run, the motorman and triprider then have little to do but to watch for signals, trips and roof falls and consequently are less likely to be injured. Speed of operations should be dependent on the type of work to be accomplished. Trip gathering and trip distributing are dangerous jobs, and the speed of such work should be slower than the speed of transportation from tipple to working sections and from working sections to tipple, but speed on main haulage roads should be reduced on sharp curves.

Mine Manager, First Class, Illinois

Electrical Mine Fires

Q.—What are the principal causes of mine fires, and what precautions would you take to guard against them?

A.—In the preceding issue, this subject was discussed, as far as all hazards, except those resulting from the use of electricity, are concerned. Causes and preventives for fires caused by electricity should now be considered.

(1) *Electric Leakage of All Degrees of Intensity*—When a path of carbonized coal is created by leakage, the passage of current increases, because the resistance of the coal is lowered by carbonization. The heat increases as the square of the intensity of the current (its amperage), but the resistance has decreased, so the energy transferred is not proportional to the square of that intensity, as is true with conductors having a certain specific resistance, but even these resistances also vary a little with temperature. Electric insulation such as suitable hangers, kept clean from self-moistening rock dust, such as gypsum dust, and proper insulation of conductors will greatly reduce leakage.

Locomotive Fires

(2) *Heating of Motors With Short-Circuiting of Current Due to Defect in Insulation or to Overloads*—Care should be taken not to overload motors and certainly not to overload them for long periods. Locomotives should be powerful enough and have weight enough to start their trips at any point along their travel and should not rely on momentum gradients to help them over the "tight places," for only too frequently in such places when they try to put their trips in motion they are stalled, with resulting damage to insulation and possible burning of armatures and field coils.

Burning of the rotors of motor-generator sets or rotary converters is menacing when such equipment is not fully automatic, for too often the machines are not closely attended. Frequent examination of motors is desirable. Rock also, falling on a locomotive, may cause such short circuits of its electrical parts as to cause a serious mine fire. If a storage battery is involved, energy will be evolved until the power of the batteries is exhausted.

Switches and Bad Roof

(3) *Ignition of Oil in Transformers or in Electric Switches*—This can be avoided by the use of other insulating liquids than oil.

(4) *Electric Short Circuits Due to Roof Falls and Sagging Wires*—Use of suitable hangers carefully aligned and properly supported when support is necessary, with frequent roof sounding and inspection, will reduce these dangers. Gunite also will eliminate such falls. Irregularity in alignment may result in the trolley wheels and shoes tearing down the trolley wires, especially when the locomotive is being backpoled. At night, if the current is left on for auxiliary fans, pumps or cutting, rock falls are particularly menacing because the mine is not patrolled, and no one may be present for some time where the fall and its consequent short circuit occurs.

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The Mannix Construction Co. at Grassy Lake, Alberta, Canada is using a big-capacity Model 8 Athey MobiLoader, as shown above, to load coal on their mining operations. This was done without the need for shooting.

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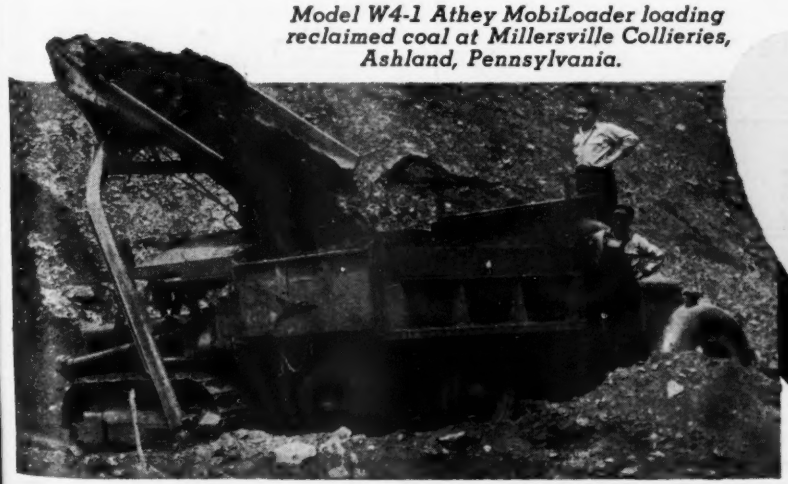
Your nearest Athey-"Caterpillar" Dealer will be glad to give you full details on Athey MobiLoaders, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

Model W4-1 Athey MobiLoader loading reclaimed coal at Millersville Collieries, Ashland, Pennsylvania.



Athey

MOBILOADERS

Operating Ideas

No Waste Space in Oil House at Bolair

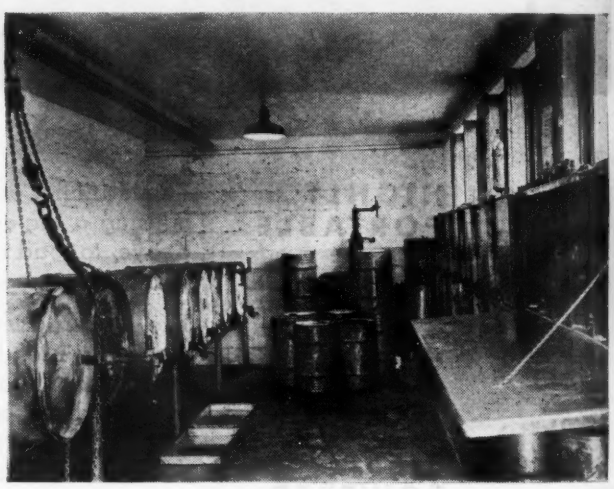
INSIDE DOORS of lockers in an oil house at the new Bolair mine of the Pardee & Curtin Lumber Co., Bolair, W. Va. (p. 93), serve as work benches as well as to prevent men reaching around into lockers where they have no business. The building, made of concrete blocks, is 10x16 ft. inside and has a porch over the lockers.

Twenty-one steel lockers in the upper row, each 12 in. wide, 20 in. high and 12 in. deep, are closed across the back by a row of three steel doors that hinge at the bottom and swing down to a horizontal position. Fifteen lockers in the upper row, each 17 in. wide, 20 in. high and 12 in. deep, likewise are closed on the back by three doors arranged in the same way.

The pair of rails has a capacity of twelve barrels inside the house. They extend outside through a barrel-sized door to form a loading platform. A monorail trolley and chain hoist over the barrel rails serve for shifting positions of loaded and empty containers.

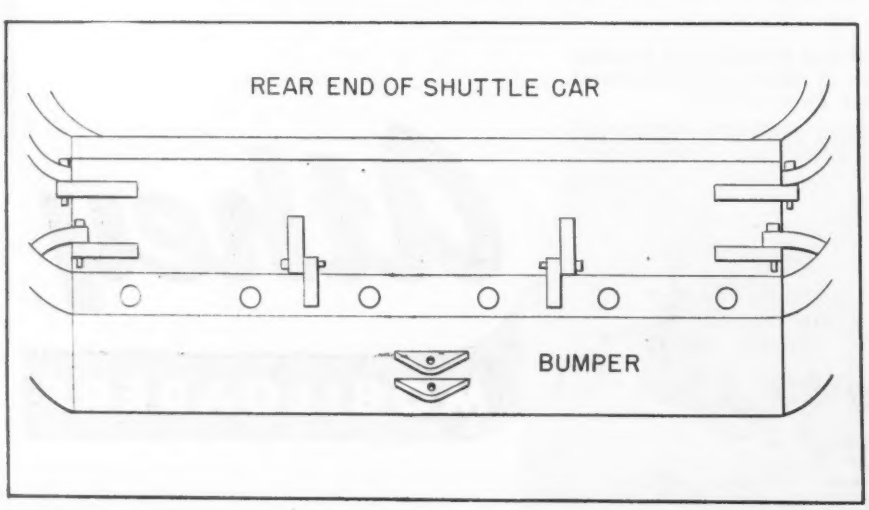
Operators of certain items of underground equipment and some of the maintenance men are assigned lockers and given keys so they can get their supplies of oil and grease without delay and without there being an attendant in the oil house.

A porch covers the lockers. Barrel door and barrel track at left.



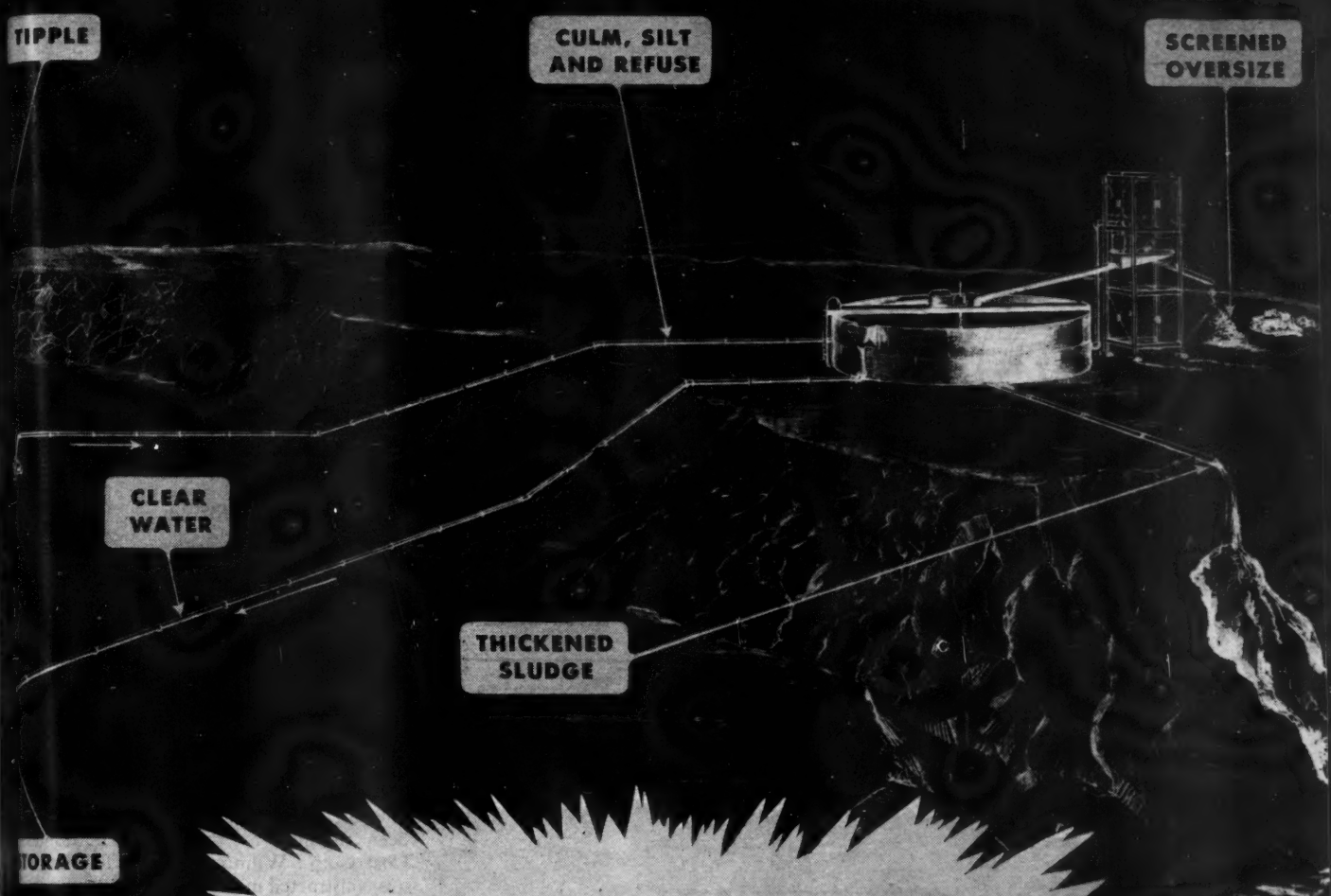
The inside door of lockers is open and forms a work bench.

Shuttle-Car Endgate Made Removable

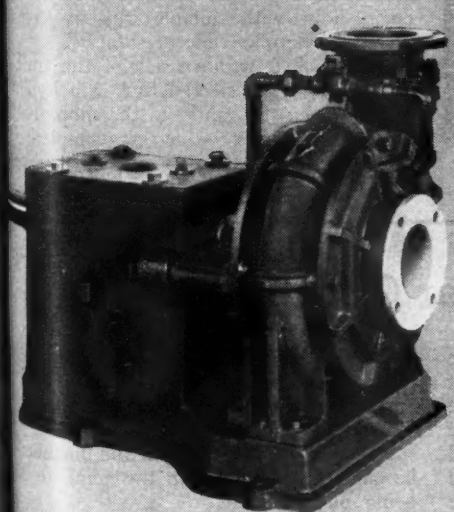


THINNING OF THE COAL in work with shuttle cars made it necessary to cut the back ends out to meet the situation, reports Thomas Jones Jr., master mechanic, Knox Consolidated Coal Corp., Bicknell, Ind. After completing the low-coal area, the machines went back into 6½-ft. work and the cutout sections again became necessary. Since it was thought that low coal might again be encountered, the decision was not to weld the cutout portions back. Instead, they were made removable by welding on loops of ½-in.-thick steel 2 in. wide. Pins were made to fit in these loops and consequently removable endgates were formed which can be taken out or replaced at will.

Loops and pins make rear end into removable endgate.



Hydroseal Pumps Can Help You!!



1—Avoid Pollution of Rivers & Streams

2—Dispose of Refuse

3—Conserve Water

The illustration shows a solution to the problem facing all operators of Tipples and Breakers through the use of Hydroseal Pumps and other Allen-Sherman-Hoff Co. equipment.

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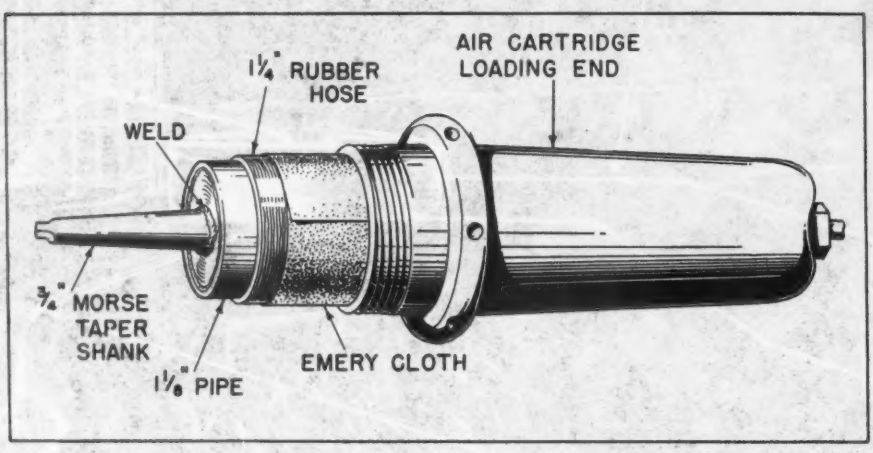
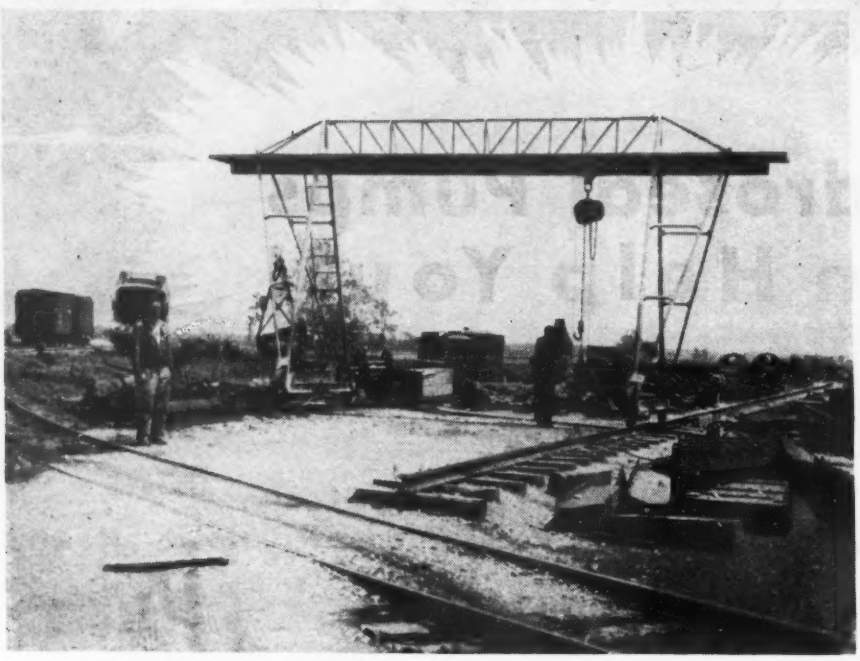
Scored Air-Breaker Tube Walls Refinished



Showing how tool and emery cloth are used for refinishing scored walls.

REFINISHING the inside cylinder walls of the loading ends of Airdox tubes after they have been grooved and roughed up is being accomplished by a special tool at mines of the Knox Consolidated Coal Corp., Bicknell, Ind., writes Thomas Jones Jr., master mechanic. A piece of 1¼-in. sand hose is slipped over the end of a section of pipe to which a three-quarter Morse-taper shank has been welded. This is inserted into an electric hand drill. The tube end is fastened in a vise and emery cloth is wrapped around the piece of hose so that it can be used as a hone. It works well, says Mr. Jones. The rubber hose keeps the emery cloth from slipping and is flexible.

Gantry Crane Saves Backaches



Gantry crane when unloaded can be moved by one man.

TO FACILITATE the handling of spare parts in a larger storage yard a gantry crane has been installed by the Northern Illinois Coal Corp., Wilmington, Ill. This crane was constructed in the company shop under the supervision of Henry Meyer, master mechanic.

The crane, shown in the accompanying illustration, is a rare tool around a strip mine. In this instance, the yard was split in two and stretched out for about 600 ft. Heavy rails laid on ties and crushed stone ballast made the gantry track solid and the travelway clean and firm. The track is level and near stockpiles on either side.

Aside from the beams forming the bridge, the crane (hand-operated) is made largely from discarded boiler flues and steel pipe. The truck wheels are mounted on roller bearings, as is the trolley on the bridge, making hand movement easy. A chain hoist with suitable capacity completes this simple, efficient crane.

The track is within reach of the truck roadway and the steel derrick which fills the gap from the gantry to the shop. The shop track reaches the derrick, completing the mechanical transportation of parts.

Special Pipe Solves Bad Water Condition

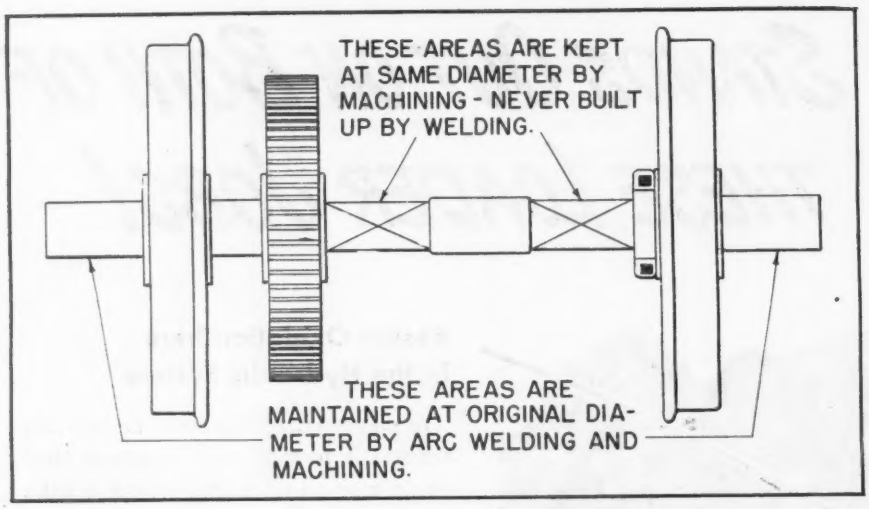
ONE OF THE DIFFICULT PROBLEMS of mine drainage is to keep the water lines intact in the presence of acid water. The Union Colliery Co., Dowell, Ill., now has in service an installation of 2-in. Johns-Manville Transite pipe which has been in operation for two years where steel pipe had to be changed every few days.

This pipe has walls ⅜ in. thick and is designed for a pressure of 200 lb. per square inch. It is operated at a pressure of about 50 lb. The joints are made with short couplings which slip loosely over the ends to be joined. Before joining, two soft rubber rings are slipped over the pipe ends, one on each length of pipe. The first ring is set at the correct location and the coupling rolled over it. The second ring is then set at its location and the coupling pushed along until both rubber rings drop into grooves in the couplings completing the joint.

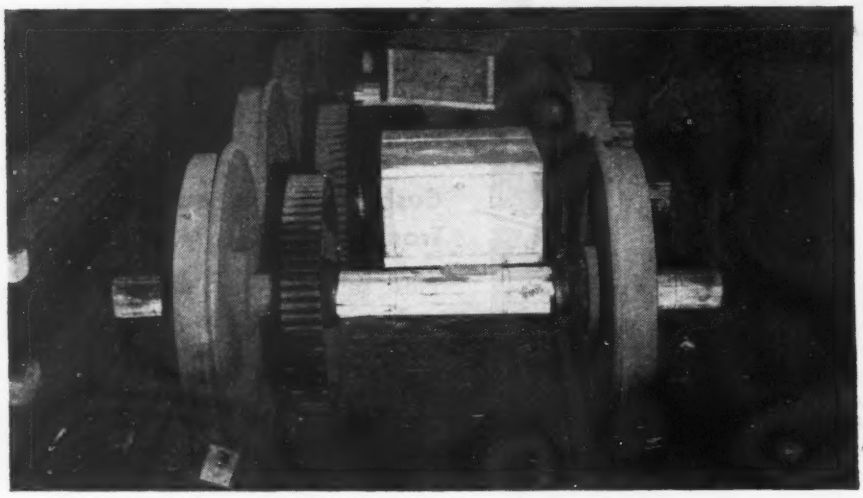
There is enough freedom in each joint to permit a 15-deg. swing, so it may be laid over hills and valleys and around curves. These joints will not hold against any considerable pressure lengthwise. Therefore, when laying a line around a short curve the elbow part of the line must be anchored to prevent the joint from being pushed apart.

This company is using an acidproof paint for coating the inside of metal pumps handling acid water. The trade name of this paint is "Permatex." According to the mining engineer, "It works."

Locomotive Axle Record Proves Helpful



Only the surfaces of the axle where the journals ride are still built up by arc welding.



Trucks ready for consignment to the collieries are tagged for quick identification.

A STUDY OF service records kept on locomotive trucks has led the supervisory staff at the Drifton shop of The Lehigh Valley Coal Co., Drifton, Pa., to discontinue building up those sections of the locomotive axle under the inside (axle-bearing) brasses. Many broken axles have been attributed to the disturbing effect of welding and machining operations on the original heat treatment of the axle.

Now the sections beneath the inside brasses, shown in the accompanying illustration, are machined to the same diameter and the difference (change from the original diameter) is made up in the thickness of the brasses. However, the sections of the axle outside the wheels where the journals ride are still maintained at the original diameter by arc welding and machining.

The finished trucks, shown in the accompanying illustration, are stored at the shop until needed at one of the collieries. The axle is protected by wooden staves wired in place after the machined surfaces have first received a coat of grease. The wooden staves prevent the flanges of one truck from damaging the axle of another while the trucks are being transported from the shop to the colliery. The brasses, four sets to the box, are boxed in excelsior and stamped for a given position on a certain axle.

Every axle carries a number and spare brasses, turned to a standard diameter on the outside, are kept in stock. If the colliery happens to need a set of brasses for an anxle they simply telephone the shop and give the number stamped on the axle. By the time the truck arrives, says William Baskin, assistant superintendent of the shop, the new brasses will have been machined to the correct inside diameter according to the data kept on record.

Hoist Switches Cars at Car Shop

A CAR HOIST located in the pit of the car shop is used to switch cars in and out, says Alfred J. Radley, foreman of wood shop, Jeddo-Highland Coal Co., Jeddo, Pa.

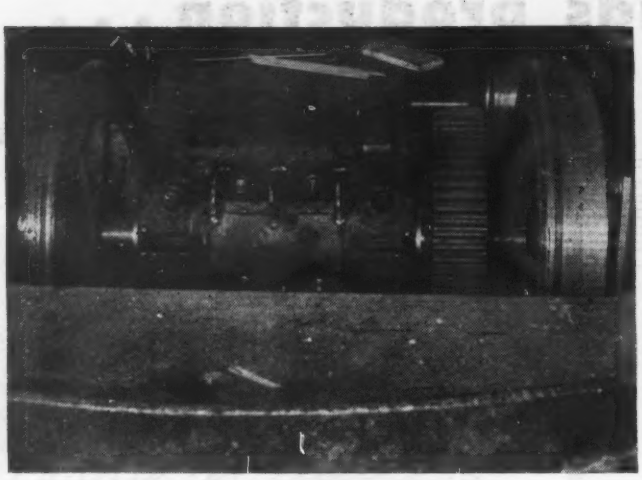
The Sullivan tugger hoist, shown in the accompanying illustration, saves shop men from possible injury almost certain to happen when cars are pushed in and out of a shop by hand. This electrically operated hoist is located in the pit and when it is not being used a cover is slid back to cover the opening. The drum is equipped with 500 ft. of ½-in. steel cable. Using a snatch block located in the outside yard, cars can be pulled out of the shop or switched around on the outside tracks.

Car hoist pit uncovered only while hoist is being used.

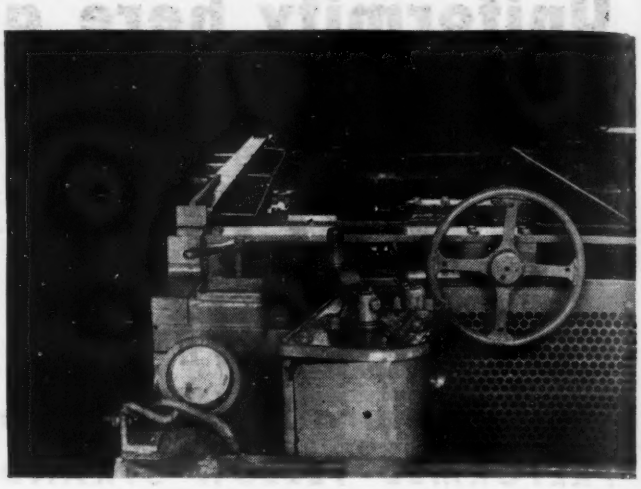
For You

This section of *Coal Age* is reserved for you and other men interested in exchanging those custom-built, time-proved operating ideas so vital to present-day coal mining. We are pleased to play the role of "Mr. In-between" and help to dress up your idea a bit before it is presented to the other fellow. For that privilege *Coal Age* willingly pays you $5 or more when the idea is published. However, it must be a mechanical, electrical, operating or safety idea which you have been using, and it should be accompanied by a sketch or photograph if it will help to make it clearer.

Rebuilding Returns Locomotive to Service



Welded-up axle assembly.



Wiring trough with wires in place.

THE FACT THAT war considerations make deliveries of new mine locomotives a matter of many months did not alter the need for one at the operation of the Freeman Coal Mining Corp., Herrin, Ill. Someone recollected seeing something that resembled a locomotive buried in the deep recesses of a sister mine. It had deeply grooved wheels, threadbare gears and pinions and deformed bumpers. What else that might be wrong had to await the light of day.

It was hauled out into the sunlight, scrubbed, dismantled and transferred to the Freeman shop. There it was given the "once over" and the nameplate deciphered. Wheels and motor frame to be rebuilt were trucked to neighboring machine shops. Renewal parts were ordered from manufacturers' agents and steel, bolts, cables and other accessories were obtained from any available source for fabrication and assembly in the Freeman mine shop.

The nameplate revealed this locomotove to be a General Electric 10-ton unit, Serial 7203, and therefore built about the year 1920. The worn tires were built up to standard dimensions by automatic arc welding, using a hard rod of approximately 0.70 carbon, and turned at high speed with "Firthrite" lathe tools. The cutting edge of these tools gives the tire a beautifully burnished finish that reduces rail-climbing propensities. This high-carbon rod greatly outwears softer rods previously used. This tire was gas-flame preheated and the heat continued during the entire welding period. New axles were made to accommodate the change of track gage. This tire and axle work was done in the West Frankfort welding shop of Westinghouse Electric Corp.

New gears and pinions were mounted on both axles and armature shafts. These are heat-treated steel gears that are expected to withstand the hard work and last for many years. Gear life is largely dependent on maintaining exact gear centers. That condition has been met in this locomotive by using ball bearings on the motor shafts and by totally inclosing the axle bearings, as described later.

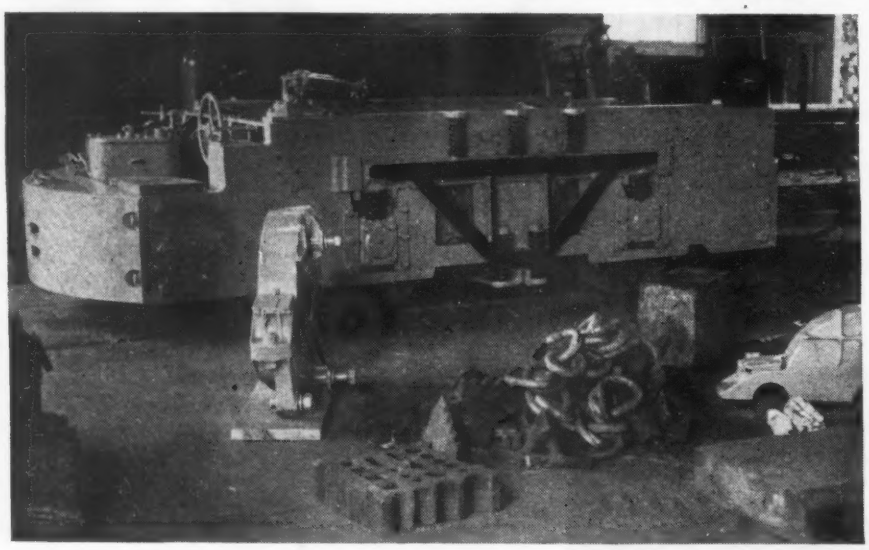
New curved-front arc-welded steel bumpers with deep center dimensions and unlikely to be deformed by collisions were fabricated in the mine shop. Thus the alignment of the side plates will be preserved. Brake hangers consisting of a forged lug permanently riveted to the locomotive frame and a through bolt that may be replaced easily make any needed bolt replacement a matter of minutes.

The outstanding feature of this job is the unusual equalizer, developed by Walter Longman, chief electrician, and used on three locomotives prior to this one. The equalizer assembly rides on the four journal springs, supports the free side of the motors from its lower member and carries the locomotive frame on its upper member. Thus the motors are entirely free from the locomotive frame. Standard suspension springs support the extra heavy suspension bars from the lower part of the equalizer frame. The main locomotive frame is cushioned on six spiral springs, three on a side. This construction gives the wheels a flexibility that prevents derailment, even on rough track.

The motors are equipped with General Electric labyrinth-type frame heads designed to keep the ball-bearing grease in and the grit out. The motor bodies were worn in the frame head seat so that part was built up and machined to standard by Giles Armature & Machine Works, Marion, Ill. These motors were originally equipped with two-bolt axle caps, which would not stay tight. The Freeman shop remedied that by welding a half circle of steel pipe between the axle caps, totally inclosing the axle between the axle linings. Steel flanges with ribs were added to this axle-cap assembly. Four extra bolts through the flanges give added rigidity to the axle caps. To make the axle inclosure more complete, recessed split collars on the axle cover the exposed ends of the axle liners, making the bearing assembly almost sand and dirt tight, preventing loss of lubricant, reducing wear and greatly extending the life of gears and pinions.

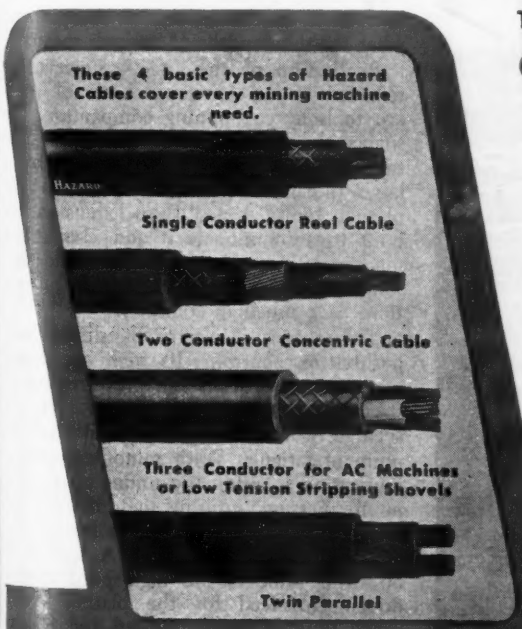
A new resistor with spiral steel grids is set in the rear cab. A Freeman overhauled Goodman controller, ML-64, is in the motorman's cab. Wire channels are

(continued on p. 134)



Completed locomotive ready to leave the shop. Equalizer is outlined in black.

HAZACORD Cables provide perfect protection against the ragged edges of coal and rock that ordinarily play havoc with mining machine cables. Hazard has built a line of cables tough, strong and flexible that ably withstand this punishment and give long service at a minimum of cost.



These **3 EXTRAS** go into every Hazard Mining Cable:

1. **FLEXIBILITY** . . . Quantities of fine, rope-stranded copper wire make these cables limp and non-kinking.
2. **STRONG INSULATION** . . . Synthetic rubber of high dielectric strength has excellent tensile strength and long aging characteristics.
3. **TOUGH, RESILIENT, TEAR-RESISTANT JACKET** . . . Scientifically processed synthetic rubber, vulcanized in a continuous metal mold, makes a smooth, strong jacket that can be pulled around rough walls and corners with the least abrasion and thus the lowest cost.

HAZARD INSULATED WIRE WORKS
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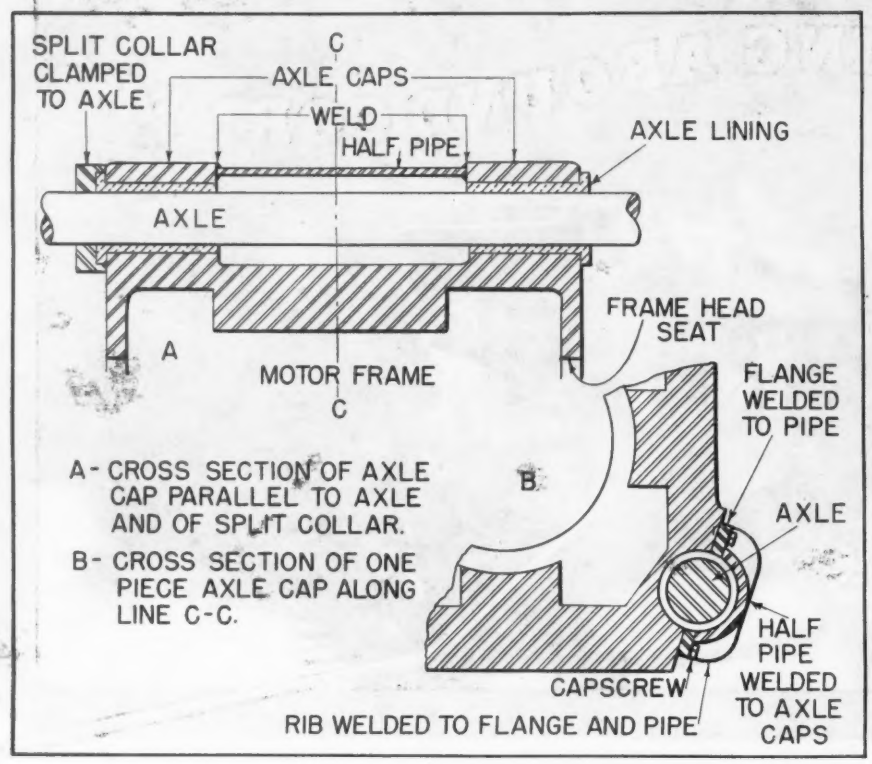
ARMY E NAVY

HAZARD Electrical Cables for Every Mining Use

Rebuilding Returns Locomotive to Service *(Continued)*



Recessed split collar protecting axle bearing from sand.

welded to the frame to carry and protect the cables connecting the controller, motors and resistor. These cables are Rockbestos AVC. An addition to the turnbuckle adjustment for the brakes is a wrench so fitted in place as to serve as a nut lock but which may be taken loose to adjust the brakes.

This locomotive is topped off with a Jeffrey trolley pole and a Flood City slider collector. The new paint is a bright color making for high visibility, a factor for safety in any mine. In addition to manufacturers already mentioned the following list of suppliers indicates that shopping around for material can yield results safely done if necessary:

Trolley collector, brake shoes, headlights—Central Supply Co.

Springs—Egyptian Sales Agency.

Resistor, frame heads—W. M. Hales Co.

Steel for bumpers—Indianapolis Machine & Supply Co.

Bolts, capscrews, equalizer steel—Peter Supply Co.

This rebuilt mine locomotive was temporarily put into relay service April 16 on 30-lb. track that was not too good. In the first two weeks it had never left the track. According to the motorman, "It rides like a Cadillac."

Modern Machine Tools Promote Efficiency

This modern shaper has strength, is easy to operate, is automatically lubricated, will do accurate work and has numerous safety features.

THE GENERAL USE of modern coal-producing machines is an established fact. They are built to tolerances that were impossible a few years ago. The workmanship is so exact that most mine-machine-shop tools cannot duplicate it. Moreover, many mechanics do not comprehend what ten-thousandths of an inch means.

Realization of these facts, however, is reflected in increasing purchases of modern tools by coal-mining companies. The shaper shown in the accompanying illustration, recently put into service by a large Indiana stripping company, is one of such tools. A new shop extension was built to accommodate it and also a new modern lathe. Their sturdiness and flexibility, together with automatic lubrication, have much in common.

This shaper is electrically driven with pushbutton control. Its high speed and ease of manipulation and great reserve of strength enable the operator to turn out accurate work at a rapid rate with a minimum of fatigue. With minor exceptions, lubrication is automatic under continuous pump pressure, insuring long life for the machine and little loss of time for the important task of lubrication. A feature of no little value is the high-speed motor-driven cross-feed for the platen, saving much time in getting second and following cuts started. High wage scales and the need for lower maintenance costs make such machine tools necessary. Modern mining machines cannot be cheaply maintained without modern machine tools.

Better Coal Preparation, accomplished by Modern Mechanized Equipment, pays Operators <u>double</u> dividends.

On the one hand, it *reduces* labor and waste—thus cutting costs. On the other, it *raises* product value by producing *clean coals*—of low impurity content, correct sizing and uniformity. And *clean coals* win the better markets—the higher prices.

These facts were so appreciated before the war that about ⅓ of all the mines in this country had already mechanized—below and *above* ground. Now, with coal production high on the priorities list, it is again possible for operators to equip for lower cost, better preparation—to meet returning *competitive conditions.*

MORROW ENGINEERS are available now to design and equip more efficient preparation plants. Ask Morrow to assign an engineer to study your situation. Write The Morrow Manufacturing Company, 1946 Ford Blvd., Wellston, Ohio. Division The Wacker Corporation.

Better Preparation
= *INCREASED SALES!*

1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
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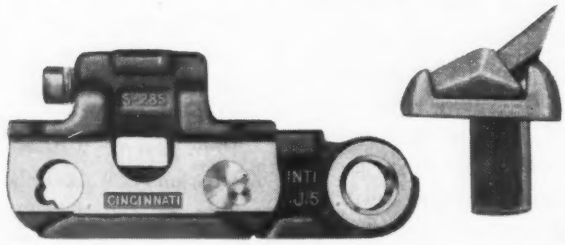
ARE you getting maximum tonnage and efficiency out of your available manpower? Why not profit by the experience of hundreds of Mine Operators all over the world who are using Cincinnati Chains . . . double-ended reversible Bits . . . and Cincinnati sturdy Cutter Bars? Their experience is the same . . . greater tonnage . . . less power consumption . . . satisfied operators . . . less maintenance and a saving in valuable man hours. Cincinnati Coal Cutting Equipment, heat treated, and drop forged, is engineered for efficient low cost performance even under adverse cutting conditions.



CINCINNATI STANDARD CHAIN

Cincinnati Standard Chain accommodates Stanex Holder and Bit or regular ½" x 1" bit. Similar in design to the famous Duplex Chain.

STANEX
HOLDER AND BIT

The Stanex Holder with factory made double-ended Stanex Bit fits all chains that accommodate the regular ½" x 1" bit.

CINCINNATI CUTTER BAR

Specially designed to meet hardest cutting conditions . . . to withstand bending stresses. Constructed to fit all popular mining machines . . . both regular and thin kerf.

THE CINCINNATI MINE MACHINERY CO.

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News Round-Up

Operators and Legislators Move To Increase Coal Supply

INCREASED EFFORTS by both operators and members of Congress to promote coal production were outstanding industry developments in July. Following closely in the wake of efforts of western Pennsylvania coal producers to obtain increased coal prices, District 8 producers (southern West Virginia, Virginia, eastern Kentucky and Tennessee) brought a number of acute problems of the industry to the attention of government officials and members of Congress at conferences June 29 and July 2 in Washington.

Seeking coordinated action to make possible increased coal production, the group, under the chairmanship of Rep. John W. Flannagan Jr., Virginia, revealed the industry's needs to Undersecretary of War Patterson, War Manpower Commissioner McNutt, Economic Stabilization Director Davis, War Production Board Chairman Krug, Price Administrator Bowles, Deputy Solid Fuels Administrator Potter, Lend-Lease Administrator Crowley and officers of the Selective Service System.

Pointing out that in 1944 the industry produced 620,000,000 tons of coal without government subsidies, M. L. Patton, vice president, Truax-Traer Coal Co., and vice chairman of the advisory board for District 8, said the impending shortage of 35,000,000 tons in 1945, with stockpiles now dangerously low, called for immediate action to avoid a disastrous situation. He said the outstanding causes of declining production are: (1) manpower, (2) materials and supplies, and (3) inadequate ceiling prices. He emphasized that joint action by the government agencies dealing with these problems is imperative if adequate production of coal is to be obtained.

After a pictorial presentation of the situation by H. A. Gloyer, vice president, Island Creek Coal Co., Harry LaViers, president, Big Santy-Elkhorn Coal Operators' Association, discussed manpower. He said: "Our present force is constantly diminishing because of old age, sickness and injury, induction into the armed forces and our inability to obtain replacements. We have tried many recruitment programs; we have sought out former employees and persuaded them to return to work; we have sent our local coal association secretaries to localities where we heard there would be layoffs, to try to employ any former mine worker that might be laid off. But despite all of these efforts we are short at least 19 percent of the men necessary to meet the estimated requirements of the Solid Fuels Administration for War. We have been forced to neglect the proper development of our mines by transferring men to higher productive sections of the mines in order to take the place of some employees we had lost and to increase over-all production. We have been compelled to forego the proper maintenance of our equipment and property because we simply did not have the men to do this work.

"As a consequence of these conditions, in the very near future it is inevitable that the present rate of production per man employed must decline. Were it not for the fact that just prior to the war a large number of mines had been mechanized or were in the process of being mechanized, thereby increasing the production per man employed, it would have been utterly impossible for the industry to make the magnificent record it has since Pearl Harbor with so drastically curtailed manpower."

Mr. LaViers then called on the war-agency representatives to stop induction of coal-mining employees; to authorize SFAW to renew certification of experienced men to work in the coal mines; to stop governmental agencies and private war contractors from enticing mine labor to other jobs and to make available 60,000 to 75,000 former mine workers now in the armed forces. He cited the precedent of the Army's recent release of men for employment on the railroads.

Other witnesses emphasized the absolute necessity of more liberal price ceilings, charging that OPA policies have had the effect of discouraging, even preventing, adequate production of coal.

Chairman Flannagan insisted that the government agency heads give these problems immediate attention and unite in working out a solution. A meeting between Stabilizer Davis, other government officials and representatives of the operators was called by Mr. Davis July 3. It found the government representatives apparently standing pat and unwilling to take any further action.

At a meeting held July 12 in the House Military Affairs Committee room Mr.

"Don't mind me, boys. I'm just a gold digger."

Flannagan was joined by Representative Andrew J. May of Kentucky and other Representatives and Senators from other coal regions in emphasizing the seriousness of the coal-mine manpower shortage to officers of the Army, Navy and federal war agencies. C. J. Potter, Deputy Solid Fuels Administrator, and John T. Jones, representing the United Mine Workers, gave detailed presentations of the manpower situation. As the reaction of Brig. Gen. Kenneth C. Royall, special assistant to the Secretary of War, and Navy Captains Hillenkoetter and Dudley A. White, representing the armed services, was not encouraging, Rep. Flannagan introduced a resolution July 17 that would direct the War Department (1) to discharge 10,000 soldier coal miners eligible for release under the point system; (2) to furlough an additional 20,000 on the condition that they return to the mines and work; (3) direct the War Manpower Commission to cease recruiting for other industries in coal-mining areas. The resolution, also introduced in the Senate by Senator Harley M. Kilgore of West Virginia, is given in full at the end of this news report.

The resolution was favorably reported in the Senate July 19 from the Military Affairs Committee. On being brought up on the floor July 20, it met opposition from Senator Gurney (R., S. D.), who said other industries also needed help (including agriculture and lumber). Although Senators Revercomb (R., W. Va.) and Barkley (D., Ky.) spoke in support of the measure, its further consideration was postponed.

Representatives of coal districts 1, 4, 7, 10, 11 and 13 also are cooperating in the efforts to remedy the coal-mine manpower shortage.

The Senate War Investigating Committee having decided July 28 on an inquiry into coal mining, Chairman Mead stated that hearings would open July 31 with Secretary Ickes as the first witness.

WPB's Mining Division is making a concerted effort to effect a substantial increase in production of needed mining machinery and repair parts, as well as endeavoring to obtain increased allocation of tractors, shovels and draglines, with Oct. 1 the goal for the increases to be realized.

July 21 brought an announcement that WPB had placed the production of coal-mining machinery on its Production Urgency List, the action being limited to production of new machines and spare parts for cutting and loading machines, mine locomotives, shuttle cars, mine cars, duckbills, electric drills and conveyors (chain, belt and shaker). This gives the manufacturers assistance in acquiring labor.

It is said that as a result of representations made to the Selective Service System local boards are being instructed that they may consider the needs of the coal mines in the deferment of registrants.

Signs pointing to a possible change in the price situation included an announcement that OPA had requested district boards representing bituminous producers throughout the country to attend a series of conferences in Washington on July 23-25. Those who were to attend were asked to submit cost figures to show whether earnings meet the minimum standards established by the Office of Economic Stabilization, which requires that profit margins be those of 1942 or 15c. per ton, whichever is greater.

J. H. Reppert, coal pricing executive of OPA, said July 25 he would recommend higher prices for coal mined in western Pennsylvania and several other districts, in a communication to Chester Bowles, price administrator, and J. F. Brownlee deputy. Mr. Reppert added, however, that it would be up to OPA to decide whether to pass the recommendation on to William H. Davis, Economic Stabilization Director, who holds the final authority on price increases.

OPA yielded Aug. 3 with increases of 3 to 20c. for all districts but Nos. 4, 5, 8, 9, 12, 13, 14, 19 and 20.

Robert P. Patterson, Undersecretary of War, stated July 2, however, that the War Department would not discharge or furlough soldier-coal miners to lighten the

Stonega Coke & Coal Forces Win "Coal-for-Victory" Awards

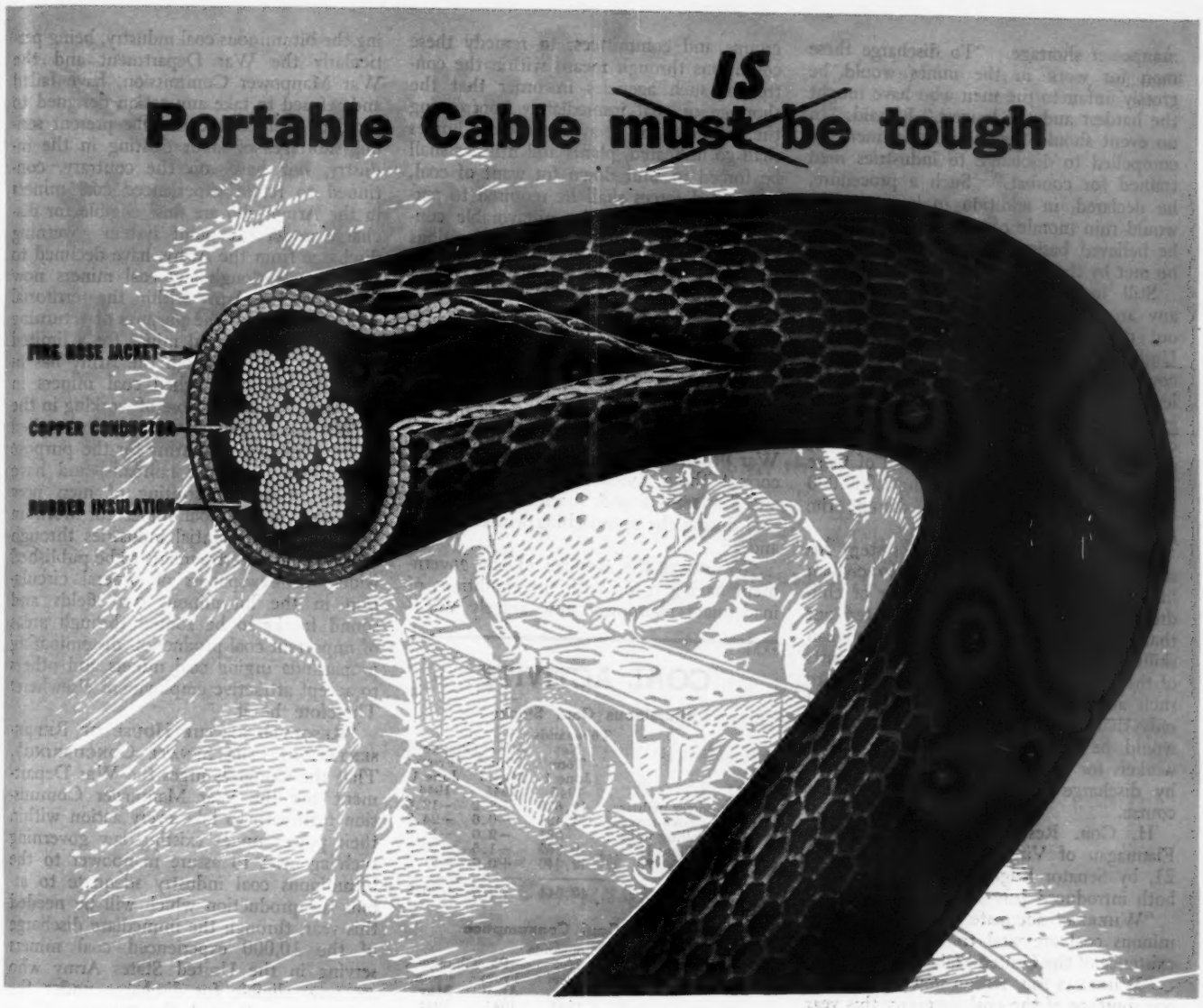
IMBODEN COLLIERY SUPERVISORY FORCE

Front Row, seated—General Night Foreman L. C. Fraley; section foremen, Loyd Christian, Curtis Herron, Richard Hamilton, R. V. Green; J. V. Redmour; Chief Electrician R. R. Jesse. Standing—Superintendent Thomas Green; section foremen, Elbert Edens, Clyde Carroll, Willard Collier, Fred Lawson; General Mine Foreman L. F. Minor; section foremen, C. C. Crockett, W. A. Christian, Wayman Barnette, T. J. Clark.

DERBY COLLIERY WINNERS

Front row, left to right—Van Weaver, C. H. Morrell, section foremen; Robert Richie, assistant mine foreman; B. M. Neel, superintendent; O. S. Powers, general mine foreman; Clyde Stamper, Ray Clendenon, section foremen. Back row, left to right—F. E. Turner, chief electrician; Ray Stewart, Robert White, Reg Weaver, H. K. Baker, T. C. Hodge, section foremen.

Portable Cable ~~must~~ IS ~~be~~ tough



WHEN IT'S FIRE-HOSE-JACKETED

Duracord

DURACORD saves rubber and yet it's one of the toughest of all mining cables. For 25 years it has proven itself under the most adverse conditions.

The fire-hose jacket is the answer. It's woven—not braided. That's the secret of its extra strength and toughness. The covering is embedded in the belt to boost tensile strength.

You'll be surprised at the flexibility of Duracord—how easily it handles. All the way through, Duracord is *engineered* by mine cable specialists with long experience.

Just examine the rugged construction and you'll see why Duracord survives the toughest mine operations.

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manpower shortage. "To discharge these men for work in the mines would be grossly unfair to the men who have fought the hardest and the longest," he said. "In no event should the War Department be compelled to discharge to industries men trained for combat." Such a procedure, he declared, in addition to being unfair, would ruin morale of soldiers, adding that he believed basic war requirements would be met by the estimated 1945 output.

Still immovable in his opposition to any arrangement for getting coal miners out of the Army and into the mines, Undersecretary Patterson asserted at a press conference July 21 that requests for release from the Army on occupational grounds "have ranged from 110,000 for coal mining to three men for breeding mice." He added that to meet all of these requests would mean discharging 1,000,000 men and would completely disrupt the point system now in effect.

He insisted that the merit system for selecting men to be returned to civilian life, based on service and number of children, must be followed. He pointed out that this system "gives no weight to civilian skills" and that "enlisted men in all parts of the world indicated strong opposition to such a basis of selection." He promised only that civilian manpower requirements would be eased, first by release of war workers for other employment, and second by discharge of soldiers in the regular course.

H. Con. Res. 67, by Representative Flannagan of Virginia and S. Con. Res. 21, by Senator Kilgore of West Virginia, both introduced July 17, are as follows:

"WHEREAS adequate supplies of bituminous coal are vital to the welfare and existence of the United States; and

"WHEREAS the nation now faces a serious shortage of the coal necessary this year properly to heat the homes and buildings of its citizens, to supply power for the plants of industry, to furnish necessary gas and coke for the operation of steel mills, which are today dangerously undersupplied with coal, to produce gas and electricity which serve the public with light, heat, power, and other essentials, and to ship overseas for the health and comfort of our armed forces and for the alleviation of suffering in foreign nations; and

"WHEREAS the shortage of coal now confronting the nation finds its source and continued existence in ceiling prices upon coal which have not permitted a fair return to the bituminous coal industry, in unnecessary delays and other difficulties in procuring necessary machinery and supplies, and especially in the reduction of manpower available to work in the mines through the reception of miners into the military and naval services and the recruiting of miners to work in other industries; and

"WHEREAS the agencies of the Federal Government responsible for the existence of these harmful conditions of price, machinery and supplies, and manpower have been besought earnestly and sincerely by the industry itself, by organized labor in the industry, by the Solid Fuels Administration for War, and by many members of the Congress, both as individuals and in groups and committees, to remedy these conditions through means within the control of such agencies in order that the shortage of coal immediately confronting the nation might be avoided before homes shall go unheated, plants and utilities shall be forced to shut down for want of coal, our armed forces shall be required to perform their duties under unfavorable conditions, and the peoples of foreign nations shall foment their existing unemployment and threatened lack of heat to the point of revolution; and

"WHEREAS those agencies of the Federal Government having to do with the conditions of prices and machinery and supplies which have contributed to the present shortage of coal and especially the Office of Price Administration and the War Production Board are now moving to correct these conditions in an effort to avoid a serious and intense shortage of coal during the approaching winter season; and

"WHEREAS the agencies of the government having to do with the conditions of inadequate manpower now gravely affecting the bituminous coal industry, being particularly the War Department and the War Manpower Commission, have failed and refused to take any action designed to avoid or even to alleviate the present serious shortages of labor existing in the industry, but have, on the contrary, continued to retain experienced coal miners in the Army who are now eligible for discharge under the point system governing discharge from the Army, have declined to release on furlough any coal miners now serving in the Army within the territorial United States for the purpose of returning such men to the coal mines for a limited period of time although the Army has in the near past furloughed coal miners in the Army for the purpose of working in the copper mines and has recently furloughed 4,000 soldiers in the Army for the purpose of working upon the railroads, and have refused to cease recruiting of men now employed in the coal mines for work in other and less essential industries through causing paid advertisements to be published widely in newspapers of general circulation in the bituminous coal fields and sound trucks to be routed through areas of important coal production disseminating propaganda urging coal miners and others to accept attractive employment elsewhere; Therefore be it

"RESOLVED BY THE HOUSE OF REPRESENTATIVES (THE SENATE CONCURRING), That the Congress urges the War Department and the War Manpower Commission forthwith to take every action within their power under existing law governing such agencies to assure manpower to the bituminous coal industry adequate to attain the production which will be needed this year, through the immediate discharge of the 10,000 experienced coal miners serving in the United States Army who are now eligible for discharge under the point system; through the granting of furloughs to 20,000 additional experienced coal miners who are serving in the Army within the territorial United States under conditions that such men return to the coal mines and work therein under regularly established conditions of employment throughout the period of their furloughs; and through the cessation of all assistance and participation in any effort to induce labor employed in coal mines and prospective labor about the coal mines to seek other employment."

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons June 1 1945	—P.c. Change— From May 1 1945	From June 1 1944
Electric power utilities	12,620	+2.2	−19.6
Byproduct coke ovens	4,428	−0.6	−24.9
Steel and rolling mills	681	−2.0	−11.0
Railroads (Class I)	9,369	−1.5	−20.2
Other industrials*	12,946	+0.9	−21.5
Total	40,044	+0.5	−20.8

Bituminous Coal Consumption

	Thousands Net Tons May 1945	—P.c. Change— From April 1945	From May 1944
Electric power utilities	5,982	+1.2	+2.2
Byproduct coke ovens	7,868	+5.6	−2.6
Steel and rolling mills	859	−0.1	+0.9
Railroads (Class I)	10,689	+0.9	−1.3
Other industrials*	11,836	+4.0	+6.6
Total	37,234	+2.9	+1.4

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

June, 1945, net tons	51,590,000
P.c. change from June, 1944	−2.1
January-June, 1945, net tons	296,430,000
P.c. change from Jan.-June, 1944	−7.1

Anthracite Production

June, 1945, net tons	5,634,000
P.c. change from June, 1944	+1.4
January-June, 1945, net tons	26,677,000
P.c. change from Jan.-June, 1944	−18.6

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
May, 1945	7,523	6,014
P.c. change from May, 1944	+206.4	+186.2
January-May, 1945	29,756	28,231
P.c. change from Jan.-May, 1944	+224.8	+151.6

Index of Business Activity*

Week ended July 20, 1945	219.5
Month earlier	222.7
Year earlier	235.3

* *Business Week*, July 27.

Electric Power Output†

Week ended July 20, 1945, kw.-hr.	4,384,547,000
P.c. change from month earlier	+0.8
P.c. change from year earlier	+0.1

† Edison Electric Institute.

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To Allow Miners More Meat

In response to persistent demands for extra allowances of meats and fats for coal miners, the Office of Price Administration announces "a further step in the developing government program to provide extra food rations to workers employed in heavy industry." A test plan, it adds, "has been put in operation in California and Colorado providing additional meats, fats and sugar rations to individual coal and ore miners, except those served by on-the-job eating places."

The plan, says OPA, is directed at carrying out the findings by the National Research Council, in behalf of the War

Food Administration, that the heavy, muscular work done by the miners calls for an unusually high intake of calories. Under the plan, miners in the San Francisco and Denver areas will be eligible for supplemental rations based on the number of days worked during the month, with a monthly maximum of 50 meat-fats points and one pound of sugar per man. These quantities may be adjusted upward or downward later as more complete studies are made.

OPA says that after experience in the test area (San Francisco and Denver) it will be extended nationally to cover all coal and ore mining regions.

It was announced July 19 that OPA will grant all coal and ore miners throughout the country and extra 50 red points monthly and an additional allotment of 1 lb. of sugar, starting early in August.

"In general," said the announcement, "all those employees who work underground are eligible for extra rations except supervisors who do not engage continuously in strenuous labor. Most employees who work above ground are excluded. Those not eligible include such persons as foremen and superintendents, watchmen and policemen, weighmasters, check weighmen and clerical and other office employees. Surface workers employed at mine sites who are eligible for supplemental rations are blacksmiths, tipple employees, persons engaged in foundry or metal casting operations and those engaged in heavy construction labor.

"Miners who qualify for extra rations will be eligible to obtain not more than 1.7 red points for meats-fats for each day they work, and 1 lb. of sugar each month, in addition to the meats-fats and sugar they can get with the stamps in their War Ration Book Four. The maximum number of supplemental red points a miner can get in any one month is 50, regardless of the time he works.

"Miners who are eligible will not apply directly for their supplemental rations. Instead application will be made for them by one of the following: (1) the transportation committee at the mine, which certifies mileage rations; (2) a joint management-labor production committee; (3) the local mine union committee; or (4) the superintendent in charge and two employee representatives. The committee will certify that each miner listed on the application is eligible for the supplemental rations and will show the number of days during the month that each miner will work."

Operations were said to have returned to normal July 19 in most Illinois mines affected by the "no meat, no work" strike, which affected nearly 10,000 miners, according to officials of the Progressive and the United Mine Workers unions.

Nearly 3,000 miners in the Springfield area of Illinois voted July 12 to stay out of the mines until more meat and red points were provided for them. City officials of Gillespie, civic clubs and other friends of the miners sent telegrams to Representatives in Congress and other officials in Washington and the State capital requesting that the workers be granted a larger meat allowance. Scattered stoppages also occurred in other regions and still more were threatened in July.

The meat situation in mine regions of other States was summarized in the *United Mine Workers' Journal* of June 15 as follows:

"West Virginia—Rep. Cleveland Bailey reported that OPA was 'countering with the proposal that they authorize certain local slaughter houses to butcher sufficient cattle to relieve the immediate situation. Restaurants in the area are allowed to pay 20 percent more than retail meat dealers and therefore receive approximately all of the meat slaughtered in the area.'

"Kentucky—The meat and lard situation is so acute in western Kentucky that miners are unable to obtain these items either from company commissaries or independent stores. As a result some mines have closed down and more miners are threatening work stoppages if the situation is not relieved.

"Ohio—'The meat situation is the same here as elsewhere—there just is not any meat in the shops,' Peter Phillippi. international board member, says.

"Pennsylvania—Distribution of meats and fats is poor, with some stores fairly well stocked and others with insufficient supplies. Where there is a fairly good supply of meat the miners do not have enough red points to buy it.

"Iowa—James Agnessen, president of the Iowa local, reports that meat is out of the question, due, first, to the fact that miners cannot obtain enough red points, and second, should one be lucky enough to have red points the markets are out of meat.

"Oklahoma—Located in the heart of the stock-raising country, David Fowler, union president, warns that unless there is some relief, production will greatly decrease.

"Colorado—A general meat shortage is said to exist, with red ration points very much in absence.

"Maryland—Many miners in the Maryland district are reported to have neither seen nor tasted meat in a month."

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District 50 Seeks Certification for Men

Signed by designated local mines, the United Clerical, Technical and Supervisory Employees' Union of the Mining Industry has filed petitions for certification as bargaining representative of the supervisory employees of six companies, three before the Regional Board of Cincinnati and three before the Pittsburgh board. Filed under authority of Sec. 9(c) of the National Labor Relations Act, the petitions involve, at Cincinnati: mines of the Octavia Coal & Mining Corp., Raleigh-Wyoming Mining Co. and Cannelton Coal & Coke Co.; at Pittsburgh, Jones & Laughlin Steel Corp. (Vesta and Shannopin mines), Pennsylvania Coal & Coke Corp. and Ford Collieries Co.

There has been no formal action by the Regional Boards in these cases, but it will be recalled that in its last majority decision involving supervisory employees NLRB held such employees to be a unit entitled to the privileges of the act when such unit was dissociated from the rank and file union. The Board has yet to rule on any certification case where the proposed foremen's union and the rank and file union are one and the same.

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Ickes Urges Coal Shipments to Europe

Coal for Europe continues to loom larger on the horizon not only in the countries threatened with shortages but on the agenda of the conferences of the "Big Three" at Berlin and in plans of the Solid Fuels Administration for War. Secretary of the Interior Harold L. Ickes, speaking as Solid Fuels Administrator, outlined plans July 20 to have the United States supply Europe with 6,000,000 tons of coal if possible by the end of this year to save both American and European lives, speed the continent's economic recovery and avoid serious political and social upheavals.

Expressing strong conviction that the needs of Europe were critical enough to justify increased discomfort to Americans, Mr. Ickes' statement said: "The race in Europe today is between coal and anarchy. Europe must have coal without loss of time if serious political and social upheavals are to be prevented. I do not think that it is going too far to say that a coal famine of such severity as to destroy nearly all semblance of law and order is certain to occur in certain countries in northwest Europe next winter unless immediate and drastic action is taken now.

"I have reached this decision only after the most careful consideration. I have been largely influenced by the urgent and unanimous recommendations of other agencies of the government which have political, policing and supply responsibilities in Europe.

"Shipments to Europe should prevent disorders which would cost American lives and they should enable the European countries to resume the production of food, textiles and other materials which we would otherwise have to supply to Europe from our own depleted stocks."

He reported that the production of coal in liberated areas had not come up to expectations, adding that "the stark situation is that today, months after the defeat of Germany, production in that country is from 5 to 10 percent of normal." In Holland and Belgium, output was down to 35 percent of prewar consumption, he said. Citing latest estimates, he said that Europe would be 25,000,000 tons short of the coal it would need between now and next April.

"And when I say the coal that it needs," said the Fuel Administrator, "I mean only enough to keep the public utilities operating, enough fuel with which to keep warm and to keep the water from freezing in millions of homes. Cold and hunger can be expected to kill thousands, and the children of Europe will surely carry the marks of the coming winter to their graves. The people of Europe, whether they be French, Italian, German or Dutch, will

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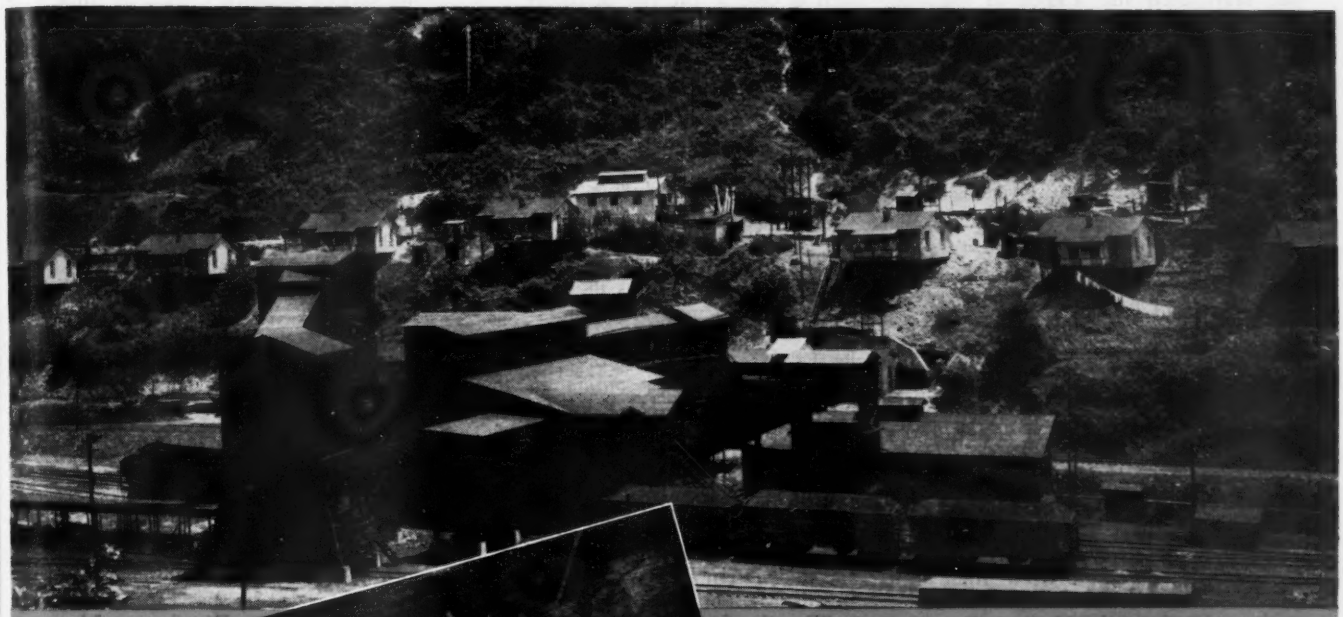

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It's just about eighteen years since the Gulf Smokeless Coal Company, Tams, West Virginia, put their first Timken Bearing Mine Cars in service at Tams. This prominent operator was among the first to start producing in the well known winding Gulf Coal Field. Today they are also operating the new mine shown in which 260 Timken Bearing Equipped mine cars are used.

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not accept such hardships supinely and without disorder.

"I do not want the life of any American soldier in our Army of Occupation to be endangered by the frenzied efforts of the people of Europe to keep from freezing this winter. Nor do I want it ever to be said that Americans loved their comfort so much they did not lift a finger to shield the brave men and women of the devastated countries of the Allies from the marrow-chilling ordeal that faces them this winter. We cannot expect a friendly handshake from hands swollen with chilblains."

Some divergence of opinion as to methods of meeting the European situation appeared in July, however. Overseas movement of coal of late, according to unofficial reports, is reported to be about 400,000 tons monthly. The goal set by Secretary Ickes for the last five months of the year would mean a threefold increase in coal movement—1,200,000 tons every 30 days. This has raised questions of cargo space and docking facilities, apart from the question of what is involved when this quantity of coal is subtracted from the already short supply in the United States.

The Maritime Commission recently fixed the freight charge of coal moving from Atlantic ports to Mediterranean ports at $15.20 per gross ton; from Gulf ports it is $16.20. The freight charge for coal moving from the U. S. to European points on the Atlantic has not yet been established.

Intensification of the problem is seen in the warnings on the bituminous supply situation from SFA during the third week in July. Mr. Ickes warned that the worst fuel shortage of the war threatened and announced that the fuel conservation directors of 25 eastern States had been requested to launch "Prepare for winter" drives immediately. Industry was advised that a severe cut might be necessary in its coal supply.

Frank G. Reed, vice president and general manager of Crerar-Clinch Coal Co., Chicago, one of the government's retail advisers, said, July 19, that the outlook was worse than bad. He asserted that President Truman was thoroughly apprised of the dangers and the seriousness of the lack of coal and underproduction the day before he left for Berlin to attend conferences of the Big Three.

"He gave a half hour to hearing the plight of the coal industry and, moreover, the consumers so far as future supplies are concerned," said Mr. Reed. "When he returns from the conferences there is no doubt that he will have something to say and orders to give on handling the situation. But I repeat: even if Europe is to receive American coal it will be a limited amount. The very least in coal supplies needed by Europeans this year is 2.3 tons to each family. We can't begin to furnish that amount. I doubt that we should try."

A detachment of 2,605 German prisoners of war was to be sent back from this country to work in German coal mines within the following six weeks, the War Department announced July 21. All miners, it was said, would retain their prisoner-of-war status throughout their work in the mines. The decision, said to have been made in response to urgent requests from the European theater of operations, was interpreted as an answer to Secretary Ickes' appeal the preceding day for the release of 30,000 coal miners in the armed forces to enable the United States to supply Europe with 6,000,000 tons of coal by the end of the year.

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Further Cuts Seen As Coal Stocks Wane

Limitations on the coal supply of most industrial plants, including those producing war materials, as great as or greater than the 20 percent cut already applied to retail sales of scarce eastern coals may be necessary in the months of peak demand next winter to maintain essential services, prevent unnecessary interference with the Pacific war and provide for minimum export requirements, according to an announcement July 14 by Deputy Solid Fuels Administrator C. J. Potter. Basing his statement on the bituminous coal outlook in the light of mine manpower shortages and changed requirements caused by the ending of the European war and after consultation with representatives of eastern and midwestern Bituminous Coal Advisory Boards, Mr. Potter said:

"For the first time since Pearl Harbor the nation is likely to be in a situation next winter where industrial stockpiles of soft coal will be sufficient to meet only a part of an estimated 25,000,000-ton deficit of soft-coal production under requirements in the fuel year that started April 1."

Overseas shipments of American-mined coals, except to the U. S. Army and Navy, are prohibited as of July 20 unless they have received the specific approval of the Solid Fuels Administration for War, Administrator Harold L. Ickes announced July 10. The action is not designed to determine or establish quotas for export but to give SFA closer control over the sources and types of coal destined for export abroad, he said. In the determination of approval of shipments for export, among the factors to be taken into consideration will be whether they fall within government quotas that may be established from time to time, whether the size and kind sought should be made available or whether the purpose for which the coal will be used can be met with lower grades than those requested.

Embodied in Regulation No. 31, the new controls require that each supplier for overseas shipment fill out an SFA application. The new regulation further provides that a separate application must be made for each cargo, that an approved application shall be used only by the person to whom it has been issued and, in order that coal shall not lie on the docks awaiting a bottom, an approved application will be good for only 30 days. It is limited to the tonnage, the source (mine or mines) and the port of exportation specified. Within five days after a cargo has been loaded, a full report must be made to SFA.

All shipments of bituminous coal from a mine or preparation plant, regardless of method of delivery or class of buyer, are subject to the ceiling prices established for producers, according to an announcement July 11 by OPA (Amendment 143 to Maximum Price Regulation 120). This change, effective July 16, required a revision in ceiling prices by some sellers who had taken the higher dealer ceilings on certain shipments, such as truck shipments to nearby domestic buyers.

To avoid a rollback in prices of these sellers to levels that would cause hardship to them and possibly interfere with distribution, OPA will receive applications for adjusted ceilings on truck-shipped coal under certain conditions. Such applications may be filed when a producer finds that his ceilings for truck-shipped coal are lower than his October, 1941, prices to the same class of customer, plus any ceiling price increase granted his mine since that time.

SFAW extended for the month of August certain limitations issued July 3 on permissible shipments to industrial consumers of coal produced in Districts 9 and 11 (eastern Kentucky and Indiana) and in District 10 (Illinois). Under these directives industrial consumers with a supply of coal exceeding 60 days' requirements were not permitted to receive, during July, coal produced in Districts 9 and 11 in an amount greater than 100 percent of their consumption requirements for that month (except by special permission from the SFAW Area Distribution Manager). In the case of coal from District 10 the limitation on deliveries (to 100 percent of consumption requirements for July) applied to all industrial consumers whose supply exceeded 30 days' requirements.

The new direction, issued July 18, contains the following further stipulation: "An individual consumer receiving coal from District 10 and from District 9 or 11, or both, is prohibited from receiving more coal in the aggregate during the month of August, 1945, than he is permitted to receive from District 9 or 11, or both, and he is further prohibited from receiving from District 10 more coal than he would be permitted to receive if he purchased coal only from that district."

Deliveries of anthracite in No. 2 buckwheat (rice) size by retail dealers are restricted, effective immediately, to 90 percent of the consumer's normal annual requirements in the fuel year that ends next March 31, Mr. Ickes announced July 17. Shipments to dealers of rice coal, used chiefly in mechanical stoker equipment for heating apartment houses and other large buildings, were earlier cut to 90 percent in the 1945-6 fuel year by SFA, so that restriction of dealer deliveries to consumers brings them into line with the dealers' receipts.

This restriction will necessitate conservation of rice coal along with other scarce solid fuels, deliveries of which are now limited to 80 percent of each consumer's annual needs. Output of rice in the 1944-5 fuel year was almost adequate to meet demand, but, as a result of manpower shortage and the May strike, production has fallen substantially.

SFA also announced that revised estimates of anthracite output, which has been hard hit by strikes and manpower

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shortage, have necessitated a further cut of 5 percent in permissible shipments of No. 1 buckwheat from wholesalers to retailers. Distributors have been notified also that during July and each month thereafter until further notice distribution of No. 1 buckwheat shall be limited to ½ of 75 percent of base-period tonnages.

Bench warrants for the arrest of three Pottsville (Pa.) anthracite wholesalers charged with violating government wartime coal distribution regulation were issued July 16. Issuance of the warrants followed filing of informations in the U. S. District Court for the eastern district of Pennsylvania July 12 against Anthony Mosolino and the Markson Coal Co., David Levine and Ben Stein and the Peach Mountain Coal Co., of which he is secretary.

They are accused of shipping anthracite to retail dealers who were not entitled to receive it under SFA regulations. These dealers have had subsequent shipments curtailed in amounts corresponding to the alleged illegal shipments.

Administrator Ickes said that the action taken in this case marked the first time the criminal section of the Second War Powers Act had been invoked by SFA for violation of regulations established under the act that provide for equitable distribution of the nation's wartime coal supply.

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Moot Points in Pact Remain Unsettled

The operators' negotiating committee of the National Bituminous Coal Wage Conference held meetings in Washington June 29 and 30 and July 9 with U.M.W. representatives to iron out points in dispute in the application of provisions of the wage agreement. Possible extension of the contract to employees not then covered also was considered. No meeting of minds was reached, however, according to the operators. Contributing to the break-up of the conference without reaching any agreement was the fact that District 50, U.M.W., had filed with the Pittsburgh regional office of NLRB two requests for certification of coal company foremen. The companies affected are the Ford Collieries Co. and the Pennsylvania Coal & Coke Corp.

NWLB granted permission July 12 to anthracite operators to pay some employees not covered by the wage agreement the same travel-time payments and night-shift differentials contained in the union agreement. It specified (1) that the adjustments may be granted only to employees on jobs immediately interrelated with those performed by members of the union and who perform at least part of their duties in conjunction with them and who have rates of pay which have borne "a definite and constant relationship" to the earnings of the workers covered by the union agreement; (2) that the increases may be made only if granted to all employees who satisfy this condition, and (3) that the increases shall not furnish the basis for any further increase in prices.

At the same time the Board placed the same limitations on approval previously granted to bituminous coal operators.

Anti-St. Lawrence Drive Organized

To guard against the menace to the economy of the Pennsylvania anthracite fields inherent in the proposed St. Lawrence hydroelectric and navigational project, a group of 50 representatives of the coal industry, United Mine Workers, business, utilities and civic organizations plan to urge Senators and Representatives to do everything possible to defeat the measure when and if it comes before Congress.

Meeting July 12 in the Hotel Sterling, Wilkes-Barre, an organizing committee was formed similar to one already named in Philadelphia and it was planned to set up a third in Pittsburgh soon and ultimately have a state-wide organization functioning. A seven-man group to represent anthracite-area opposition to the project includes: Peter A. Garrity, coordinator of Wilkes-Barre, Scranton and Pittston chambers of commerce; Martin Brennan, president, District 7, U.M.W.; George A. Roos, general manager, Philadelphia & Reading Coal & Iron Co.; Gomer Morgan, chief counsel, Delaware, Lackawanna & Western R.R.; Chester B. Lawson, Pottsville division manager, Pennsylvania Power & Light Co.; Richard Edwards, manager, Bright & Co. department store, Lansford; and Col. Ernest G. Smith, president, Wilkes-Barre Publishing Co.

The meeting, arranged by Anthracite Industries, Inc., and presided over by J. M. Crosby, of that organization, was addressed by Thomas J. McGrath, Washington, executive director, National St. Lawrence Project Conference; Norman Patton, Anthracite Institute, and Richard Maize, Pennsylvania Secretary of Mines.

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Work Starts On New Harlan Highway

Construction has been started on a new State highway extension costing $238,878 to extend to the new Glenbrook plant of the Stonega Coke & Coal Co., on the headwaters of Clover Fork. Contract was awarded July 12 by the Kentucky Highway Commission for 5 miles of road extending to about the Virginia line.

•

To Test Illinois Coal; Strip Tax Vetoed

Governor Dwight H. Green of Illinois has signed H.B. 817, making it a law. The bill creates a commission consisting of two members of the House, two members of the Senate and two members appointed by the Governor to conduct a demonstration-test program for investigation of and experimentation with Illinois coal and coal products to determine the commercial feasibility of methods having commercial possibilities and promise. The measure appropriates $80,000 to the commission for this purpose.

The Governor disposed July 27 of the last remaining bill enacted by the 64th General Assembly when he vetoed the measure that would have levied a new State tax of 4c. a ton on all strip-mined coal. In vetoing the bill he gave as one of his reasons his opposition to any new State taxes at this time. The strip measure was intended to replace a 1943 law which is inoperative because of a court injunction. The tax, the executive said, was not justified and, moreover, discriminated against that particular kind of coal mining. Revenue from the measure, it had been proposed, was to have been set aside to level and restore the topography of the mined land.

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F.P.C. Sets Hearings In Natural-Gas Probe

Initial hearing in the Federal Power Commission's general investigation of the natural-gas industry has been set for Sept. 18 in Kansas City; the second will be held Oct. 9 in Oklahoma City and the third Oct. 30 in New Orleans. Dates will be announced later for hearings to be held in other producing areas and in certain consuming centers.

An outline of the subjects to be covered in the proceeding has been issued by the commission, signed by Chairman Basil Manly. Under the general heading "Reserves" the following suggested subjects have been listed: (a) proved reserves of recoverable gas; (b) recent important discoveries and prospects for future discoveries; (c) factors involved in probable life calculations, and (d) life history of typical outstanding fields that have been abandoned or greatly depleted.

The second major subject is "Practices and Problems as Related to Production for Interstate Commerce" and is subheaded: (a) technical factors related to peculiar properties of natural gas; (b) special problems in the production of casing head gas; (c) data, by years, on gross production and marketed production; (d) development of coordinated practices in production; (e) effects of taxation on gas, gas-producing facilities and leaseholds, and (f) field prices in relation to production.

Under the topic of "Extent and Control of Physical Waste" the outline suggests that evidence be presented on: (a) kinds of waste; (b) extent of physical waste; and (c) remedial measures—accomplishments and further steps to be taken.

"State Laws Governing Production, Waste and Conservation" is the fourth major subject to be considered, and it is suggested that material be offered on (a) history of control statutes by the States; (b) recent developments and present situation as to State conservation legislation and its administration, and (c) legislative history, activities and accomplishments of the Interstate Oil Compact Commission.

Development of long-distance transmission interstate pipelines, significance of the large investment required and sales and rate data on pipeline companies are listed under the general heading of "Interstate Pipelines." Also given under this heading are the problems of eminent domain relative to pipeline construction, the effects on

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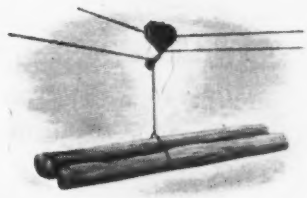

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pipeline companies of restrictions on "export" and "import" of natural gas in interstate commerce and requisites of a sound public policy with respect to the expansion of interstate natural-gas pipelines in the postwar period.

A comprehensive study of the utilization of natural gas is foreshadowed in the subheads under this general topic, which include: (a) policies regarding the use of natural gas; (b) characteristics of available data on utilization; (c) utilization of natural gas for U. S. totals and States for 1937 and 1943 by classes and functions; (d) question of controlling "end uses"; (e) use of natural gas in the manufacture of carbon black, and (f) economic relations of natural gas with competing fuels and raw materials. The interest of consumers of natural gas and the question of legal restrictions on "exports" and "imports" of natural gas in interstate commerce also are listed under this head.

The final topic is headed "The Potentialities of Synthetic Production" and covers such matters as potentialities regarding the entire fuel and raw material complex, costs, processes, recent foreign developments, extent of development of synthetic processes by U. S. companies, government agencies and foreign interests, and the national defense aspect.

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L. & N. Equipment To Cost $27,000,000

Louisville & Nashville R.R. announced plans July 21 for expenditures for equipment that would bring to $27,000,000 the outlay for the year for the main company and its subsidiary, the Clinchfield R.R. Included in the additional equipment will be 1,000 coal cars, $2,650,000, and 1,000 box cars, $3,700,000, as well as 3,000 coal cars and 300 box cars for the Clinchfield, for which L. & N. will bear half the expense. Sixteen diesel locomotives to be used at New Orleans, Mobile and Pensacola will be added at a cost of $985,000.

The road had previously announced, on July 11, that it would spend $10,250,000 on equipment. At that time James B. Hill, president, said: "I am preparing an order now for 2,000 freight cars to cost $5,000,000. We have ordered 16 locomotives to cost $1,500,000 and have just bought eight locomotives costing $1,500,000. We are ordering 28 streamlined passenger cars to cost $2,250,000. We are planning line improvements to cost from $5,000,000 to $10,000,000 a year."

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Anthracite A.I.M.E. Elects Officers

W. C. M. Butler, Central Pennsylvania Quarry Stripping & Construction Co., Hazleton, Pa., was elected chairman at the annual meeting of the Pennsylvania Anthracite Section of the American Institute of Mining and Metallurgical Engineers, held July 14 at the Valley Country Club, Hazleton, Pa.

Other officers named were: vice chairman, Harry W. Montz, Lehigh Valley Coal Co., Wilkes-Barre; secretary and

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TYPE OF WORK	Approximate No. of 1¼" x 8" Cartridges per 100 lbs.
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Red H* C	276
Red H* D	316
Red H* F	356
For Rock or Fine Coal	
Red H* B	280
Collier* C	320
For Wet Work	
Hercogel* A	200
Hercogel* 2	240

HERCULES

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HERCULES POWDER COMPANY
INCORPORATED
936 KING STREET
WILMINGTON 99, DELAWARE

*Reg. U. S. Pat. Off. by Hercules Powder Company

XP-54

treasurer, Floyd S. Sanders, Goodman Mfg. Co., Wilkes-Barre. Executive committee, for one year—C. A. Garner, Jeddo-Highland Coal Co., Jeddo; Harry Otto, Hudson Coal Co., Scranton; R. Y. Williams, consulting engineer, Pottsville; B. H. Stockett, Locust Coal Co., Shenandoah; Robert L. Klotz, Hercules Powder Co., Hazleton. Executive committee, two years—Evan Evans, Lehigh Navigation Coal Co., Lansford; Ralph Lambert, Pennsylvania Coal Co., Scranton; Wilmot Jones, Jeddo-Highland Coal Co., Jeddo; William B. Wells, estate agent, Pottsville; William B. Geise, Susquenhanna Collieries Co., Nanticoke. Executive committee, three years—Henry Dierks, Glen Alden Coal Co., Wilkes-Barre; C. D. Rubert, Lehigh Navigation Coal Co., Lansford; George A. Roos, Philadelphia & Reading Coal & Iron Co., Pottsville; John S. Marshall, Greenwood Mining Co., Scranton; Oscar W. Shimer, Hudson Coal Co., Scranton.

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Goodyear Men Win First-Aid Contest

As hundreds of coal-mine employees and their families looked on, eight teams composed of rescue squads of six men each from nearby mines competed in a first aid contest June 15 at Bellaire, Ohio. Winner of the event was the team of the Wheeling Township Coal Co. (subsidiary of the Goodyear Tire & Rubber Co.). Problems involving accidents common to coal mines were given by the judges to the captain of each team. A time limit was set, and at the end of the specified period the results were carefully checked.

Sponsored by the State of Ohio in conjunction with the United Mine Workers of America, the event was the first of the kind in the State since 1925. Among the spectators were mine workers from the State's three largest mining counties (Belmont, Harrison and Jefferson) and from neighboring West Virginia. Special guests included Governor Frank J. Lausche of Ohio; J. L. Ireland, president of the Ohio Coal Association, and Adolph Pacifico, vice president of Local No. 6, U.M.W.

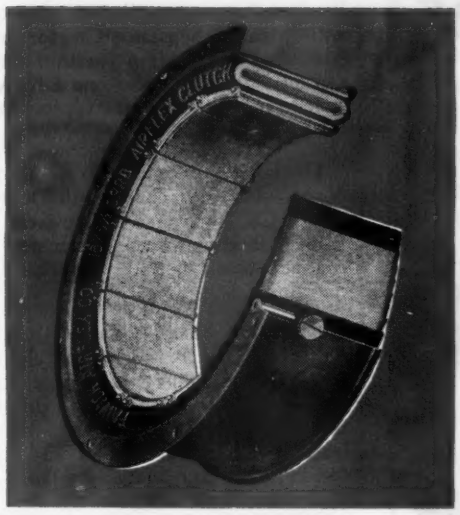
Climaxing the ceremonies was a brief talk by Governor Lausche stressing the value of efficient first aid in saving human life, after which he presented to each member of the winning team an attractive aviation pilot's watch. The prizes were donated by the U.M.W. Also contributing materially in making the event a success was Ed Lewis, contest committee chairman and personnel manager of the Goodyear-operated mine. Winning team members included Louis Jesalosky (captain), John Douglas, John Hayest, Rennie Bradley, Kenneth Greer and John Bober.

•

Preparation Facilities

Russell Mining Co., Old Forge, Pa.; Spring Brook Breaker—Contract closed with Menzies Separator Co. for one 2-ft. Menzies cone to clean No. 4 buckwheat coal; feed capacity, 6 t.p.h.

Oak Ridge Coal Corp., Raven Run



WAR RECORD PROVES PERFORMANCE...FOR HEAVY-DUTY DRIVES

Thousands of Diesel-driven craft of many types have been equipped with Fawick Airflex Clutches. Without a single exception these ships are more effective, through greater maneuverability and more dependable performance under battle conditions.

The proved advantages and economies of the Fawick Airflex Clutch are now available for all industrial equipment that calls for heavy service clutches, brakes, slip clutches and power take-offs.

Airflex is the only clutch that controls torque by air pressure—without springs, levers or toggles. Direct or remote control. No adjustments to make—no lubrication required. Misalignment presents no problem. Maintenance costs unusually low.

Let us *engineer* the Fawick Airflex Clutch to your machines. Book on request.

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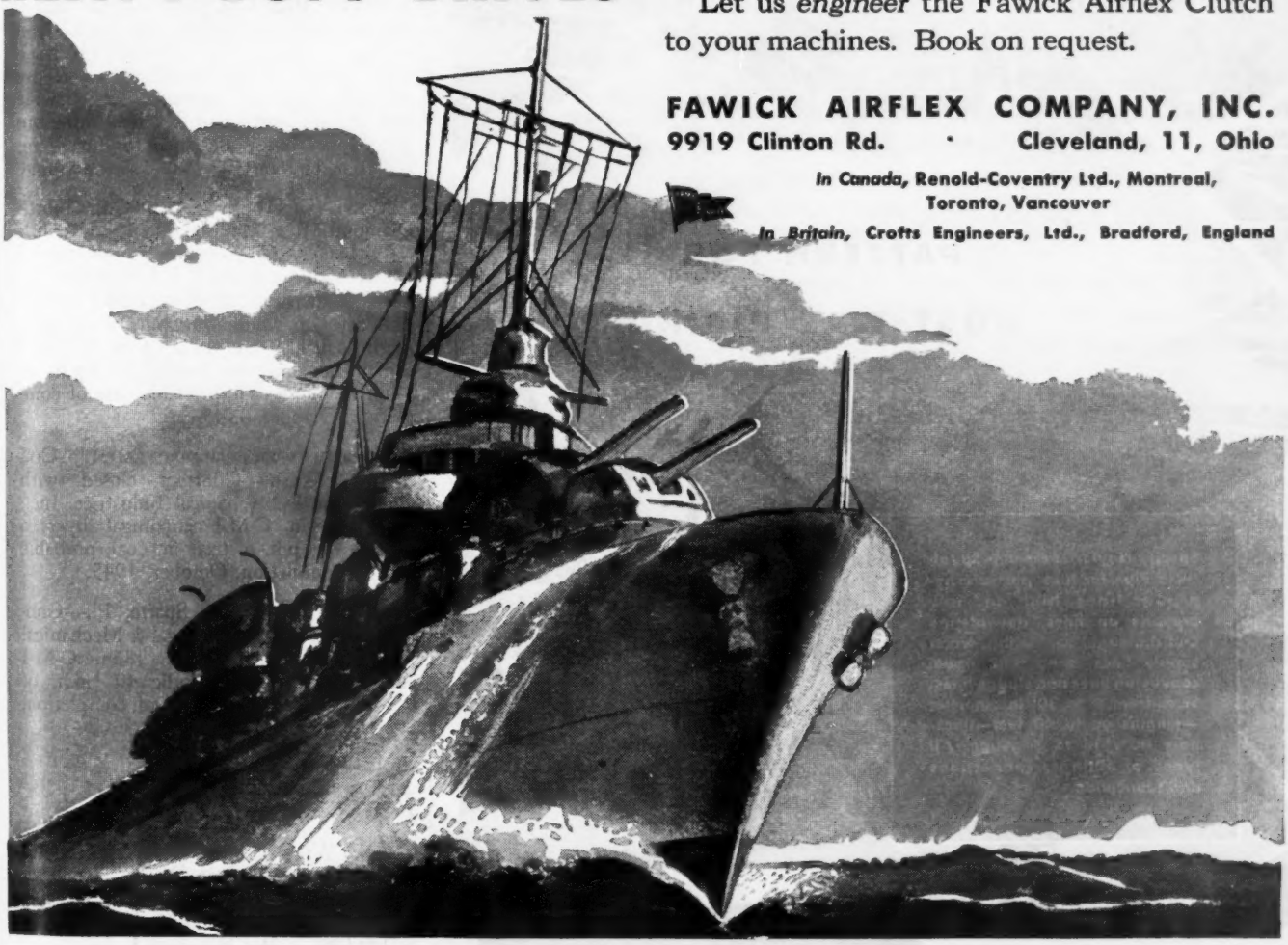
In Canada, **Renold-Coventry Ltd., Montreal, Toronto, Vancouver**

In Britain, **Crofts Engineers, Ltd., Bradford, England**



FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

Breaker, Raven Run, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean chestnut coal, feed capacity, 70 t.p.h.; also one 8-ft. Menzies cone to clean buckwheat coal; feed capacity, 70 t.p.h.

DEFIANCE COAL CO., Mentmore, N. M.—Contract closed with Deister Machine Co. for one double-deck 4x6-ft. Plat-O vibrating screen to rescreen 0x2-in. coal at rate of 75 t.p.h.; addition to existing tipple.

REPUBLIC STEEL CORP,, Clyde Mine, Frederickstown, Pa.—Contract closed with Fairmont Machinery Corp. for structure with conveying equipment to deliver coal from existing cleaning plant to railroad loading terminal at rate of 735 t.p.h. of 0x4-in.; to be in operation by Jan. 1, 1946.

FOURSEAM COAL CORP., Fourseam, Ky. —Contraact closed with Kanawha Mfg. Co. for Kanawha-Belknap calcium chloride washer; capacity, 80 t.p.h. of 5x2-in. coal.

SYCAMORE COAL CO., No. 12 Mine, Cinderella, W. Va.—Contract closed with Kanawha Mfg. Co. for mine-run dumping and conveying system, 300 t.p.h., consisting of trip feeder with in-built track scale, power rotary dump, apron feeder and elevating belt conveyor 42 in. wide and 165 ft. long; plant will load mine-run temporarily but is designed for future installation of four-tract shaker-screen tipple.

WEST KENTUCKY COAL CO., North Diamond Mine, Madisonville, Ky. (Roberts & Schaefer Co., engineers)—Contract closed with Centrifugal & Mechanical Industries, Inc., for one 48-in. C-M-I centrifugal dryer to handle 55 t.p.h. of ¼-in.x10-mesh coal; also one 48-in. Type S C-M-I centrifugal dryer to handle 20 t.p.h. of minus 10-mesh coal; probable date of completion, October, 1945.

NORTHWESTERN IMPROVEMENT CO., Roslyn, Wash.—Contract closed with Centrifugal & Mechanical Industries, Inc., for one 48-in. C-M-I centrifugal dryer to handle 40 t.p.h. of 0x⅜-in. coal; probable date of completion, October, 1945.

MOFFAT COAL CO., Sparta, Ill.—Contract closed with Centrifugal & Mechanical Industries, Inc., for one 48-in. C-M-I centrifugal dryer to handle 40 t.p.h. of 0x¼-in. coal; probable date of completion, September, 1945.

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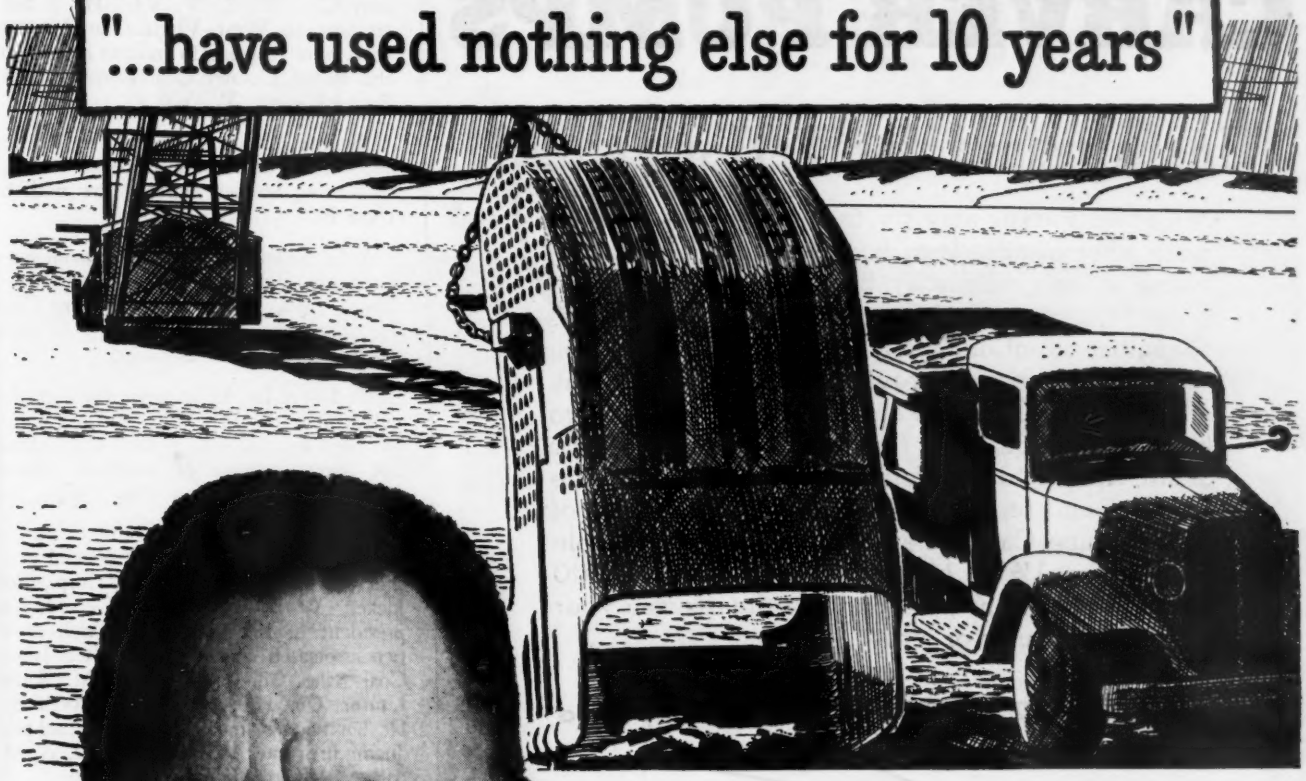
Personal Notes

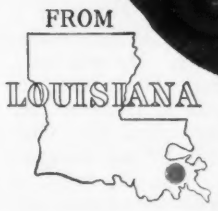
J. W. WOOMER, head of J. W. Woomer & Associates, Wheeling, W. Va., has been elected vice president of Pierce Management, Inc., Scranton, Pa. He will continue as head of J. W. Woomer & Associates.

EARL R. MCMILLAN has been appointed assistant manager of coal operations and chief engineer of the Northwestern Improvement Co. with headquarters in the Smith Tower, Seattle, Wash. He formerly was mining engineer with the company.

H. L. COPHER, formerly with the Pyramid Coal Corp., Terre Haute, Ind., has been appointed general manager of the

"...have used nothing else for 10 years"





EDWARD SWAN; General Manager
Walter P. Villere, General Contractor
New Orleans, Louisiana

One of a series of testimonial letters received from all parts of the United States

"...our company uses in the construction business one of the largest draglines in the South, a Walking Monagan, capable of handling 10 cubic yards of dirt at a time.

...machine which is now working on an emergency levee building job on the Mississippi River at Baton Rouge, is powered by a Fairbanks Diesel motor.

...as you know, a Diesel motor operates faster, and under increased pressure of heat, ordinary oils form carbons and plug up piston rings...power and compression are cut to an alarming extent.

...ten years ago Macmillan Ring-Free Motor Oil was recommended as a solution to the problem of keeping machine in prime working order...we have used nothing else since.

...having been around machinery all my life, have yet to see any other motor oil accomplish in both Diesel and gasoline motors what Macmillan Ring-Free can do."

Excerpts of letter from– Edmund Swan

Other equipment operated by Villere Company: two P. H. Shovels, 1¼ yard capacity with Waukesha motors; four 1½-Ton Ford Trucks, one 1½-Ton International, one 1-Ton Diamond T; 1940 Imperial Chrysler, 1942 Oldsmobile, 1936 Chrysler, 1941 Plymouth. On Macmillan Ring-Free, of course!

MACMILLAN RING-FREE MOTOR OIL

Operators of all types of equipment report lower-cost, more efficient performance with Macmillan Ring-Free Motor Oil. Find out how it can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

50 W. 50th Street, New York 20 • 624 So. Michigan Avenue, Chicago 5 • 530 W. Sixth Street, Los Angeles 14 •

Ward Division of the Kelley's Creek Colliery Co., Ward, W. Va. He is not a stranger to West Virginia, as for many years prior to going to Indiana he was with the Boone County Coal Corp., Sharples, Boone County, W. Va.

SYDNEY A. DOBBS, Price, Utah, has been appointed a State mine inspector in Utah, succeeding Stanley Harvey, now with the Utah Fuel Co.

A. W. SPAHT has retired as general superintendent above ground at the southern Illinois mines of the Old Ben Coal Corp. He had been with the company 28 years, starting as electrical engineer.

ED LUTZ, for 33 years in the electrical department of the Old Ben Coal Corp., has been appointed as general superintendent above ground of southern Illinois mines of the Old Ben Coal Corp., vice A. W. Spaht, retired.

PAUL D. RITTER, assistant general manager of the Red Jacket Coal Corp., Red Jacket, W. Va., has been elected vice president of the company as well as of two associated companies, the Red Jacket Coal Sales Co. and the W. M. Ritter Lumber Co. He succeeds C. B. Weakley. He has been connected with the coal-producing firm since 1930. His father, W. M. Ritter, is chairman of the board.

JNO. W. HOWE retired Aug. 1 as general superintendent of the Block Coal & Coke Corp. and the Tennessee Jellico Coal Co., operating in Campbell County, Tennessee. On that date he completed 28 years of continuous service as general superintendent.

C. A. REED, of the staff of the National Coal Association, is being lent to the War Department for a European mission in connection with fuel engineering problems in Germany and elsewhere on the Continent. Assigned to the Office of Chief Quartermaster of USFET, his headquarters will be at Frankfort. He will hold the rank of Field Officer. He is being accompanied by HOWARD A. HERDER, fuel engineer of the Sahara Coal Co., Chicago, who has been lent by his company to assist in this mission for the Army, which is expected to require six to eight weeks.

WALLACE CLOSE, formerly general superintendent of the Minds Coal Mining Co., operating in West Virginia, has been appointed general manager by W. L. and C. J. Sherman, Cumberland, Md. He will direct the mines operated or controlled by the Sherman interests, which are expanding operations in the Georges Creek field.

ROBERT K. SMART, assistant general superintendent, Canadian Collieries, Ltd. (Dunsmuir), has been advanced to general superintendent, vice HAROLD BAIRD, resigned. Mr. Smart had experience in coal mines of England and Scotland befor moving to Canada in 1908, when he entered the employ of the Western Fuel Co. and later became sales engineer of Canadian Collieries.

COLONEL ROBERT P. KOENIG, Carmel, Ind., president, Ayrshire Collieries Corp., has been decorated with the Order of the British Empire. The decoration was pre-

THIS NUT *Knows its place*

Wherever there are slot positioners, spring tension, compression or other types of positioning devices, you'll want Elastic Stop Nuts on the job, holding their exact adjustment. Elastic Stop Nuts, because they successfully resist the effects of vibration, shock, impact and other loosening influences, are ideal for positive maintenance of position.

It Stays Where It's Put

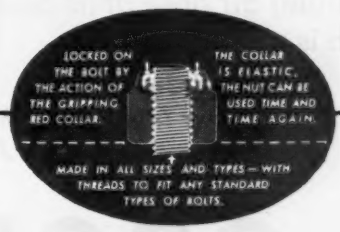
You'll always find the Elastic Self-Locking Stop Nut where you place it, because this nut always stays put. The Elastic Stop Nut holds an adjustment with a sure grip whether seated against a surface as in the slot positioner illustrated above or unseated on a threaded part.

The Elastic Stop Nut uses its head —because built into it is a red collar. This is an elastic compression collar that molds itself to the individual threads of the bolt, locking tight.

You need no jam nuts, cotter pins or other locking auxiliaries when you use Elastic Self-Locking Stop Nuts. They refuse to loosen, creep or "back off" under the toughest, most critical operating conditions. Yet they never rust or freeze in place and can be easily removed when necessary.

Proved in billions of wartime applications, Elastic Self-Locking Stop Nuts give definite insurance against loose nuts and consequent delays, breakdowns and extra maintenance work. From delicate, precise aircraft installations to heavy-duty tank installations, these nuts with the red elastic collar have shown their gripping power. Elastic Self-Locking Stop Nuts are the sure way to greater safety, economy and reliability.

LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY



ESNA
TRADE MARK

ELASTIC STOP NUT CORPORATION OF AMERICA

Plants at: Union, New Jersey and Lincoln, Nebraska

Sales Office: 1060 Broad Street, Newark 2, New Jersey

sented by Air Marshal Arthur Tedder, British Army, who was Assistant Commander of SHAEF, at formal ceremonies July 13 in Frankfurt am Main held in connection with the final gathering of General Eisenhower and his staff officers on the occasion of the disbandment of SHEAF. Colonel Koenig headed the Solid Fuels Section of SHEAF and, in this capacity, was in charge of coal and mineral production of the various conquered and liberated countries of Europe. With the abandonment of SHEAF, Colonel Koenig now becomes associated with the successor organization, United States Forces in the European Theater.

EUGENE J. KERR has been appointed manager of technical services, Baltimore & Ohio R.R. He has been associated with the Island Creek Coal Sales Co., Huntington, W. Va.

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Research Program Gives Encouragement

Outlining the experimental work now getting under way to develop a coal-burning gas turbine, John I. Yellott, director of research for the locomotive development committee of Bituminous Coal Research, Inc., reported July 11 at a meeting of members of the Technical Advisory Board with the fuels division staff of Battelle Memorial Institute, Columbus, Ohio, that such a turbine may be utilized in locomotives or in stationary plants to meet competition from the diesel engine.

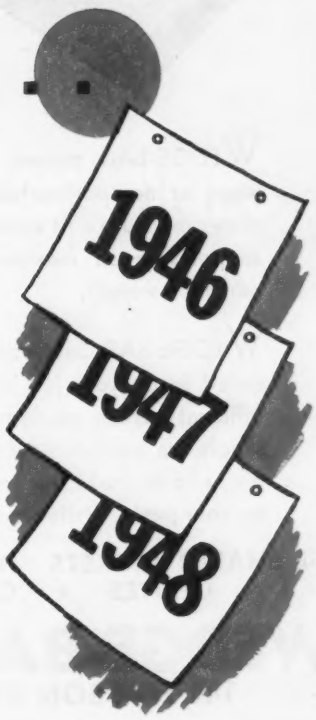
Reviewing current research activities of the coal industry and meeting to make plans for continuing laboratory work on a number of projects, preliminary findings revealed by the research engineers working on residential group heating included a plan for heating a number of houses from a single central stoker-fired plant. Their report showed that by district heating the ultimate convenience in comfort heating is possible with coal in community housing projects and at costs less than for heating individual homes with competing fuels. Highlighting the meeting was a report that probably more than 500 railroad locomotives have been equipped with overfire jets to eliminate smoke.

Forming Regional Groups

It was announced that B.C.R. is forming regional research committees to supplement the work of the Technical Advisory Board and spread interest and knowledge concerning coal research. Earl C. Payne, consulting engineer, Consolidation Coal Co., stated that four regional units are being organized in Kentucky, Indiana, West Virginia and Kansas-Missouri area. He added that similar groups are to be formed by other local operators' associations in cooperation with regional groups of technical societies and mining engineering schools.

Fuel engineer members of T.A.B. re-elected Julian E. Tobey, director, Fairmont Goal Bureau, New York City, as chairman for 1945-46. He served as chairman of the July 11 meeting, which was

WHO is going to wrap them up for you next year . . . .



NORMALLY, which means most of the time, coal finds its way from your mine to a user because it had a guide . . . *somebody sold it.*

Four years of War have made this fact easy to forget. Falling into the swing of a "seller's" market is natural . . . but *hazardous.*

DON'T TIE YOURSELF TO AN EMERGENCY by forgetting that selling will again be as important as cars for the movement of coal . . . *and soon.* Before long Uncle Sam will retire from the coal sales business and the easy days of too many orders will be but something to remember.

Keep your sales outlet alive . . . post-War competitors won't wait for you to build a new one. If you have a sales connection . . . *preserve it.*

If you have no sales connection now . . . *get one.* Post-War competitors won't wait while you find a new market for your coal.

AMERICAN COAL *Sales* ASSOCIATION . . . Washington, D.C.

called to order by Howard N. Eavenson, Pittsburgh, Pa., president, B.C.R.

All chairmen of standing committees were reelected, including Eugene Kerr, gasification and carbonization; Vernon Leach, industrial utilization; Carroll Hardy, hand-fired heating; Fred Prosser, residential stokers; Earl Payne, regional research; Henry Hebley, mining and preparation; Julian Tobey, motive power.

A new committee on agricultural uses for coal headed by R. L. Sutherland, Truax-Traer Coal Co., was appointed by Mr. Eavenson. Other members are Thomas C. Cheasley, Sinclair Coal Co.; Howard A. Herder, fuel engineer, Sahara Coal Co., and Vernon G. Leach, fuel engineer, Peabody Coal Co.

The meeting was attended by 26 members of T.A.B., including Elmer R. Kaiser, assistant director of research; T. A. Day, special representative, and Ralph H. Hopp, technical information service, as well as five guests, including Frank Chambers, Chicago Smoke Department; H. C. Howard, Carnegie Institute of Technology Coal Research Laboratory; Vaughn Mansfield, Southern Coal Co., Memphis, Tenn.; A. D. Singh, Institute of Gas Technology, Chicago, and C. D. Stewart, Westinghouse Air Brake Co.

The entire T.A.B. group inspected laboratory projects under way for B.C.R. at Battelle, including the smokeless stove, the inverted underfeed stoker, tests for rating warm-air furnaces, a smokeless hand-fired furnace, flow model of locomotive air supply and numerous other fact-finding tests needed by the bituminous coal industry.

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U. K. Pilot Plant Now in Operation

Machinery now is in operation in the new $50,000 coal-testing pilot plant at the College of Engineering, University of Kentucky, Lexington, where research work is contemplated on all types of coal produced in Kentucky, including shales, bone coal and waste. It is planned to produce smokeless coal by low-temperature carbonization, with such resultant byproducts as oils, explosives, dyes, chemicals and material for use in plastics, rubber, pharmaceuticals, etc. The plant is in charge of Prof. C. S. Crouse, who said that test runs under heat would start soon.

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Obituary

JAMES COCHRON ANDERSON, 70, commissioner of the Illinois Coal Operators' Association from 1937 until last November, died July 7 at Danville, Ill., after a four months' illness. He was associated for a number of years with the United States Coal & Coke Co.: from 1918 until 1927 as superintendent of all the company's mines, and then for ten years as assistant to the president, when he resigned.

HERBERT TUTWILER, 64, president, Black Creek Coal & Coke Co., operating in Jefferson County, Alabama, died July

15 at Pante Cedra, Fla., while on a vacation trip.

F. F. TAGGART, 72, president, Spruce River Coal Co., with mines in the Kanawha field of West Virginia, and also head of the Pleasant Valley Mining Co., with mines in Ohio, died July 24 at his home in Massillon, Ohio.

WALTER HENRY (POPE) WALSH, 45, federal coal-mine inspector, was killed July 21 in a mine cave-in near Seattle, Wash. He had been in the service of the Bureau of Mines since 1942 and was the first government coal-mine inspector to lose his life in the line of duty since the federal inspection program was launched four years ago. A legal resident of Rock Springs, Wyo., he had been employed at various times in mines in Idaho, Washington, Montana, Utah and Colorado as miner, diamond-drill operator and in other capacities.

•

Plan Coal Terminal On Lake Erie

Plans for the construction of a coal and ore terminal on the Lake Erie waterfront at Toledo, Ohio, were announced July 9 by the New York Central and Baltimore & Ohio railroads. The cost of the project is estimated at $15,000,000.

The two carriers stated that legislation under which the project may be carried out had been enacted by the State of Ohio, but that approval by the Interstate Commerce Commission must be obtained before construction could be started. The new terminal will provide facilities for the transfer of coal from cars to vessels and of ore from vessels to cars. It will be owned and operated by a corporation formed and controlled by the two railroads.

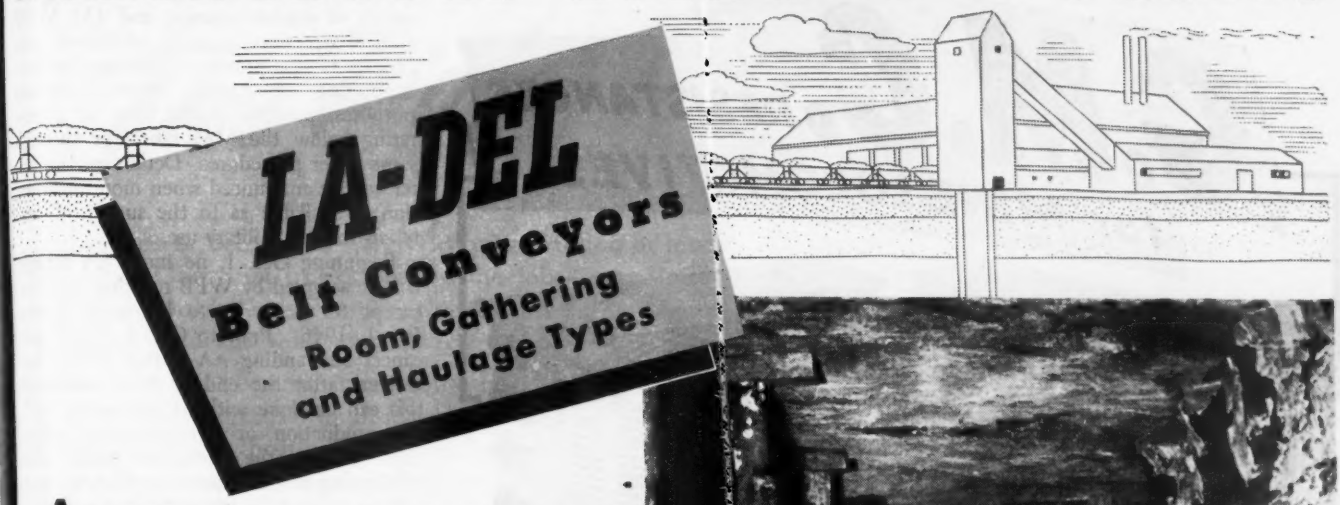
•

Simplified Priorities Go Into Effect

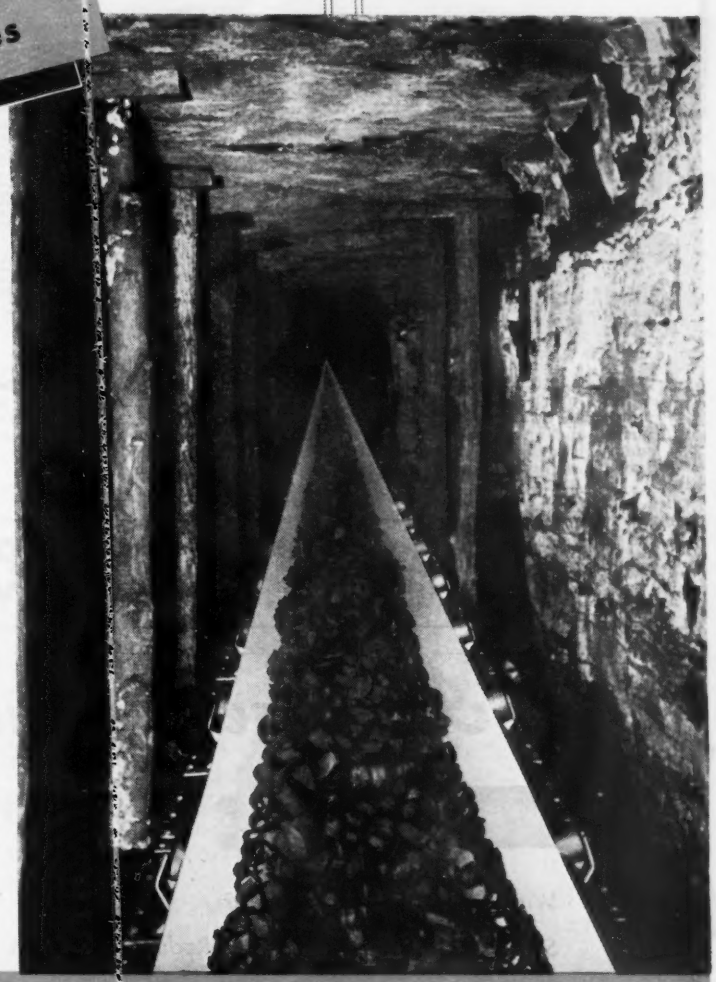
A simplified priorities system to be in effect during the six-month transition period from July 1 to Dec. 31 has been announced by War Production Board Chairman Krug. The changes are designed to cushion the impact of the transition from a system under which nearly all production has been regulated to a new system under which military requirements will have top priority while civilian business will generally operate without production restrictions and without affirmative priorities assistance.

The new procedures are outlined in Priorities Regulation No. 29, the controls of which take precedence over any other WPB regulation or order "unless the other expressly states the contrary." Under the new rating system, the previous AA rating method and the Controlled Materials Plan will be discontinued at the end of 1945 and replaced by a system in which (1) the AAA rating will still be assigned in emergencies as under existing procedures; (2) a new MM rating will be assigned by military agencies, except in a few instances in which WPB may assign

UNDERGROUND HIGHWAY *to* PROFIT



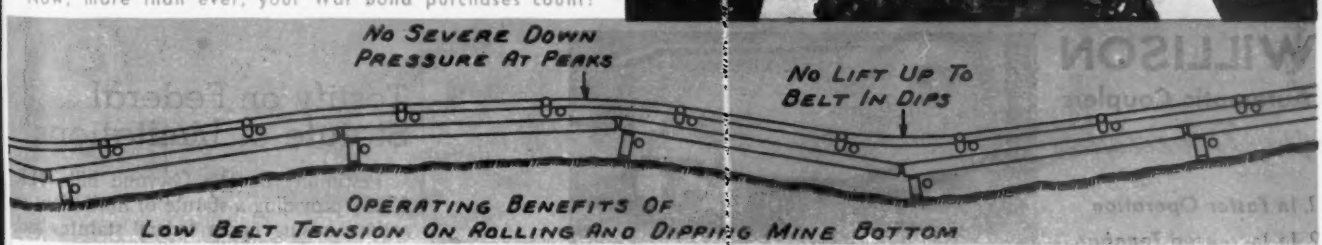
LA-DEL
Belt Conveyors
Room, Gathering and Haulage Types



A La-Del belt conveyor, easily and quickly installed and *economical to operate,* provides a direct road to more profitable operation. The smooth, continuous flow of coal from the face, made possible through the use of La-Del belt conveyors, saves time, money and manpower.

For example, a La-Del belt conveyor requires minimum headroom and will operate efficiently over rolls and dips in the mine bottom. That's time saved from non-productive tasks; man-hours that can be devoted to producing coal. La-Del conveyors are designed for a specific job . . . to move your coal quickly and economically. There's a host of features on La-Del belt conveyors that you'll want to know about if you're looking for peak production at minimum cost.

Now, more than ever, your War Bond purchases count!



Operating Benefits Of Low Belt Tension On Rolling And Dipping Mine Bottom

Other LA-DEL Equipment for the Mines . . . Shaker Conveyors • Chain Conveyors • Elevating Heads • Pit Car Loaders • La-Del Troller Mine Ventilating Fans and Blowers • and La-Del Experienced Engineering Counsel . . . Before and After Installation.

MATERIAL HANDLING LA-DEL MINE VENTILATION

LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

the MM rating directly where it is clearly necessary for the war effort or for requirements of similar urgency; and (3) WPB will, if necessary, provide additional procedures to give priorities assistance for war-supporting or highly essential civilian purposes, possibly in the form of a new rating below the MM rating or through some other procedure. Details on the latter will be announced when more information is available as to the supply of materials for non-military use.

Beginning Oct. 1, no more AA ratings will be assigned by WPB or other agencies except for deliveries to be made before Jan. 1, 1946. Prior to Oct. 1, WPB will cancel outstanding AA ratings calling for delivery after the end of 1945 whenever this can be done without interfering with war production or war-supporting activities. During the transition period the MM rating will be equivalent to AA-1 and will be applied by the military services to new orders and also to existing orders if necessary to assure delivery on schedule.

At the end of the transition period, Dec. 31, 1945, the Controlled Materials Plan and all of its regulations will expire automatically, except that part of it that restricts inventories. Delivery of controlled materials during the third and fourth quarters will continue to be regulated by the plan alone and not by ratings, and regular applications for allotments usually will be required for the fourth quarter. Regulations for maintenance, repair and operating supplies will remain in effect through Dec. 31, and after that date ratings generally will not be given on a blanket basis.

Mines and mining manufacturers will continue to acquire equipment and materials as heretofore until changes in Order P-56 or Order L-269 may be announced or further steps in the transition plan under Priorities Regulation No. 29 may be ordered. The pattern of controls to be continued after Jan. 1, 1946, if any are required to assure necessary equipment and materials to mines and mining manufacturers, will be determined by the over-all supply picture which develops during the next few months as the transition to the new priorities system takes place.

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Testify on Federal Statute of Limitations

Testimony on the Gwynne bill (H.R. 2788) providing a statute of limitations on actions arising under federal statutes such as the anti-trust laws, Fair Labor Standards Act, Walsh-Healy Act and the Salary Stabilization Act was presented July 2 to the House Judiciary Subcommittee by Douglas B. Maggs, solicitor of the Department of Labor, and Special Representative Holtzoff of the Attorney General's office.

Mr. Maggs took the stand taken by Wage-Hour Administrator Walling, advocating a uniform federal statute of limitations but insisting that one year is too short a period and suggesting that three years be substituted; also that the law should not recognize any shorter time fixed by State statute.

Representing the Department of Justice, Mr. Holtzoff testified to the effect of the

The Right Trucks FOR ALL TRADES

Light loads or heavy pulls, long-distance hauling or local delivery—Chevrolet trucks will do the job economically and dependably, because they are designed, engineered and built for truck work exclusively.

Because truck operators recognized the famous features of Chevrolet trucks as "built-in values" they bought more Chevrolet trucks than any other make in seven of the last nine prewar years. These same features are continued in the 1945 Chevrolet trucks. Should your needs demand extra payload capacity, your Chevrolet dealer can provide the right truck by the installation of the necessary equipment (auxiliary axles, springs, trailers, bodies, etc.).

Buy only as much truck as you need, because it's payload, not chassis weight, that pays profits. *Buy a Chevrolet truck—the right truck for all trades.*

BUY MORE WAR BONDS
HELP SPEED THE VICTORY

NEW 1945 CHEVROLET TRUCKS

All Chevrolet trucks are equipped with the famous valve-in-head six-cylinder truck engine—recirculating ball-bearing steering—diaphragm-spring clutch—hypoid rear axle—articulated hydraulic brakes—sturdy truck frame.

HEAVY-DUTY TRUCKS, 134½-inch and 160-inch wheelbases—Load-Master engine, 93 horsepower, 192 foot-pounds of torque—4-speed transmission, power take-off opening—hypoid single-speed full-floating rear axle—2-speed rear axle—auxiliary rear springs—all-steel cab.

LIGHT DELIVERY PICK-UP TRUCK, 115-inch wheelbase—90-horsepower engine—3-speed Syncro-Mesh transmission—hydraulic shock absorbers, front and rear—all-steel cab—unit-designed body.

SCHOOL BUS CHASSIS, 160-inch and 195-inch wheelbases—safety features to comply with all state regulations: vacuum-power brakes—Tru-Stop, propeller-shaft hand brakes—propeller-shaft guard—special heavy-duty front springs and front axle—two-stage, progressive-action rear springs—double-acting shock absorbers—20-gallon side-mounted fuel tank. Other features same as heavy-duty.

CHEVROLET MOTOR DIVISION
General Motors Corporation
DETROIT 2, MICHIGAN

CHEVROLET

ONE OUT OF EVERY 3 TRUCKS IS A CHEVROLET

Gwynne bill in its present form on a number of federal statutes, suggesting modifications that would not particularly affect operation of the Fair Labor Standards Act.

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Truax-Traer Buys Riverfront Tract

A riverfront tract of 114 acres at Ceredo, near Huntington, W. Va., has been purchased by the Truax-Traer Coal Co., Chicago, for postwar development as a rail-river coal transshipment point. The reported price was about $60,000.

•

F.P.C. Sets Hearing For Met. Pipeline

An order has been entered by the Federal Power Commission setting a hearing for Oct. 15 in Washington on the application of the Metropolitan Eastern Corp. for a certificate authorizing it to construct and operate about 825 miles of 18-in. natural-gas transmission pipeline from the Carthage field of Texas to a point near Hamilton, Ohio. The project is to cost $23,500,000 and bring into the Appalachian area an additional 140,000,000 cu.ft. of gas daily, equal to about 7,000 tons of coal.

•

Thacker Mine Sold To Lando Owners

Thacker No. 1 mine of the Puritan Coal Corp., on Pigeon Creek in Mingo County, W. Va., has been sold to the group that owns and operates the Lando mine, situated nearby. The Puritan Coal Corp. will continue operations under the same name as heretofore.

•

Tipple Loss $100,000 At Hickory Mine

Hickory mine tipple of the Girton & Fugate Coal Corp., five miles south of Brazil, Ind., was destroyed by fire July 15, with a reported loss of $100,000. An elaborate system of conveyors and shaker screens, tractors, trucks and other machinery, as well as 350 tons of coal were destroyed.

•

Ships First Coal

Standard Mining & Converters Corp., Chicago, which several years ago bought the Standard Oil Co. mine at Standard City, Ill., hoisted coal for the first time and also shipped its first carload of coal June 26. Coal is being hoisted out of the material shaft now and about 30 men are employed. It is expected that as operations progress more men will be employed.

Schuyler Coal Co. Buys Farm Tract

Schuyler Coal Co., operating 2 miles north of Rushville, Ill., has purchased a 100-acre tract in Rushville township for $60,000. The company also has obtained an option to purchase a 160-acre tract on the Rushville township slab road 3 miles north of Rushville for $48,000.

•

Equipment Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in June, as follows: Type LH rock-dust distributor; 15-hp. motor, 230 volts, d.c.; Approval 532; June 1; American Mine Door Co.

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Association Activities

MINERAL PRODUCERS' ASSOCIATION OF PENNSYLVANIA elected the following directors for two years at its annual meeting: John B. Brunot, Greensburg; Ray S. Walker, Bigler; William A. McBride, Burgettstown; Raymond R. Bowie, Grove City, and Frank B. Wood Sr., Barnesboro.

OHIO RECLAMATION ASSOCIATION has been organized to reforest land made barren by stripping operations. It was formed by strip-mine companies to replace a former Ohio reclamation committee, now inoperative, according to Alan R. Davidson, chief engineer of the North American Coal Corp., who has been elected president of the new group. Directors include Lawrence H. Underwood, assistant vice president, Youngstown Sheet & Tube Co.; Samuel James, James Brothers Coal Co.; F. R. Phillippi, Dye Coal Co.; Frank Dunning, Crescent Valley Mining Corp., and William L. Burt, Marion Coal Co.

AMERICAN STANDARDS ASSOCIATION has reelected as chairman of the Mining Standardization Correlating Committee Daniel Harrington, chief, Health and Safety Service, U. S. Bureau of Mines; Lucien Eaton, representing the American Mining Congress, has been reelected vice chairman; M. D. Cooper, divisional general superintendent, Hillman Coal & Coke Co., representing the Coal Mining Institute of America, has been elected second vice chairman; executive committee—Benjamin F. Tillson, consulting engineer, representing the American Institute of Mining and Metallurgical Engineers; William T. Davis, supervising engineer, Ocean Accident & Guarantee Corp., representing the National Conservation Bureau; E. A. Holbrook, dean, School of Engineering, University of Pittsburgh, member-at-large.

•

Coal Publications

Detonators: Initiating Efficiency by the Miniature-Cartridge Test, by R. I. Grant and J. E. Tiffany, U. S. Bureau of Mines.† T.P. 677, 34 pp., 5⅞x9¼ in.; paper. Price, 10c. "Initiating efficiency is more exact

Boarding-House REACH

• It's a big help in stepping up production . . . in moving stock piles fast and efficiently, loading coal, sand, cinders, snow, and other materials...this "boarding-house reach" of an Oliver "Cletrac" crawler tractor and front end loader.

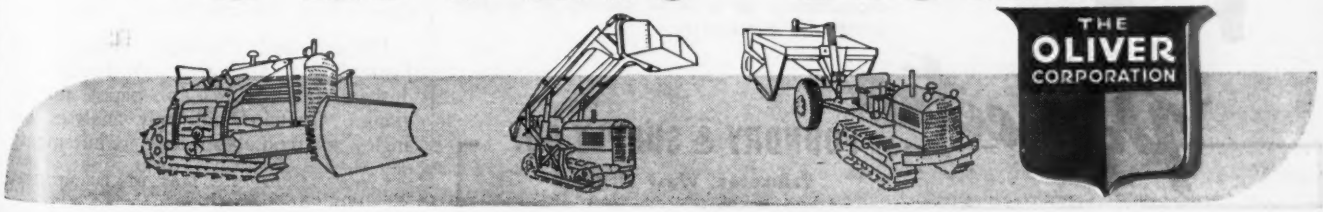
The low over-all height of this unit (only 5′-2″ with bucket lowered) makes it the ideal machine for operating through doorways, car doors or low openings. Its controlled "tip-up" bucket prevents spillage of loose materials and with no extra weight at the front end of the tractor the lifting capacity of the loader is increased. And with Oliver "Cletrac's" exclusive *controlled differential steering,* there are no undue strains on any parts when handling heavy front end loads.

The sealed lower track wheel construction of an Oliver "Cletrac" tractor keeps mud, dirt and water out of the bearings . . . keeps oil in. Rugged construction with drop forged and rolled steel parts eliminates excess weight . . . assures long, dependable service. Unusual accessibility makes maintenance an easy task.

Substantial numbers of Oliver "Cletrac" tractors and front end loaders are now being released for essential use. Your Oliver "Cletrac" dealer will gladly assist you in making application for new equipment.

The OLIVER Corporation, Industrial Division,
19300 Euclid Avenue, Cleveland, Ohio

OLIVER - Cletrac



than the expression "strength," which generally has been used hitherto in this connection. Inexpensive, suitable for indoor use and for a wide range of detonator strength, and independent of weather, quickly performed and capable of close control are among the test's qualifications.

Accident Statistics as an Aid to Prevention of Accidents in Bituminous Coal Mines, Coal-Mine Accident-Prevention Course, Section I.† Miners' Circular 47, 40 pp., 5⅞x9¼ in.; paper. Price, 10c.

Pumping Engineering Data, 416 pp., 4⅞x8⅛ in.; cloth. Economy Pumps, Inc., Hamilton, Ohio. Devoted largely to practical advice and information for pump users of all kinds, this book contains details regarding sizes, capacities, motor horsepowers and prices of Economy pumps.

Geology and Coal Resources of the Coos Bay Quadrangle, Oregon, by J. E. Allen and E. M. Baldwin, Department of Geology and Mineral Industries, Portland 5, Ore. Bull. 27, 160 pp. with separate maps, 8½x11 in.; paper. Price, $1. Though thin, faulted, interstratified, of limited area, immature and young coals, the Coos Bay products may eventually have worth because of their location. About 3,000,000 tons is mined annually for local needs.

L'Exploitation des Tourbières (The Exploitation of Peat Bogs), by F. de Nauvion. Editions, Albin Michel, 22 Rue Huyghens, Paris, 14; 404 pp., 6½x10 in.; paper. Price, $2.91 (140 fr.) Formation of peat, its composition, properties, operation, extraction, tearing apart and mixing, handling and transportation, drying (natural and artificial), milling, briquetting and conditioning, etc.

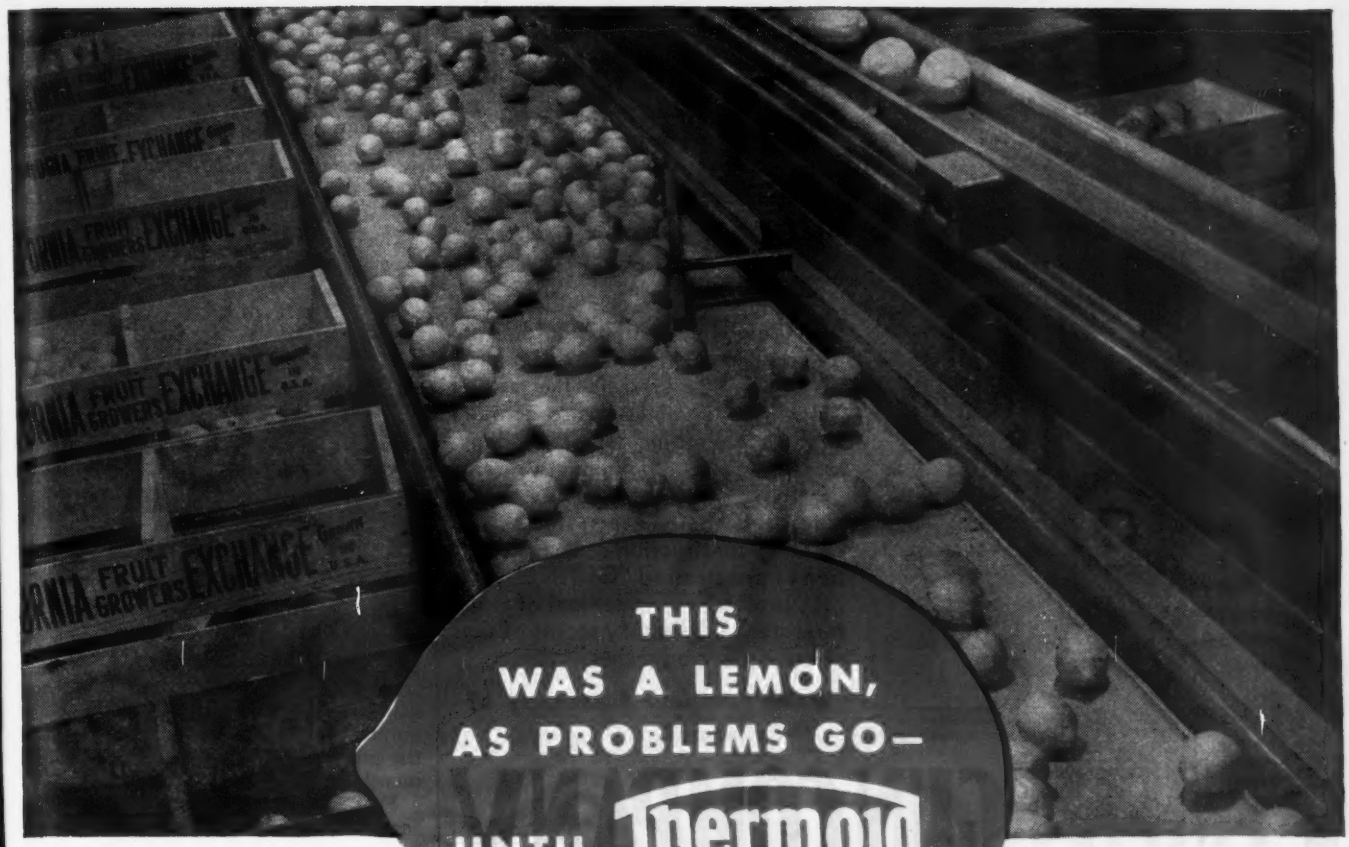
Annual Report of the Research Council of Alberta, 1944. 18 pp., 6½x10 in.; paper. Coal for an underfeed stoker should be noncoking unless an agitator is provided. Because an agitator provides against coking, any Alberta coal can be burned regardless of maturity. Some few Alberta coals made such a dense clinker that they could not be burned satisfactorily in an overfeed stoker. Survey of Wapiti-Grande Prairie coals is reported.

How to Train Your Assistants, by R. W. Wetherill, National Foreman's Institute, Deep River, Conn. 20 pp., 3⅞x6¾ in.; paper. Price, 25c. Well written, concise and distinctly helpful, based on the principle used when the would-be swimmer is pushed off the dock. The assistant should be required to define his problem, to suggest a solution, to make further suggestions, to select the best and reincarnate the question into a plan of action.

What a Foreman Needs for Success, National Foreman's Institute, Deep River, Conn. 16 pp., 3⅞x6¾ in.; paper. Price, 25c. Foreman should be a leader rather than a boss, the captain of a team.

Physical and Chemical Properties of Pennsylvania Anthracite, Anthracite Industries, Inc. 8½x11⅛ in.; paper, mimeograph. Contains not only analyses but angles of repose, air-draft requirements,

† Apply Superintendent of Documents, Washington 25, D. C.



THIS WAS A LEMON, AS PROBLEMS GO— UNTIL Thermoid SOLVED IT!

While studying the citrus fruit packing industry, Dr. McClelland discovered that lemon sorters and graders were suffering unusual eye fatigue, which could be corrected by using grading belts of a special color. Dr. McClelland then specified a color which would give sufficient contrast to the color of the fruit for efficient sorting and yet provide a softer background, restful to the eyes of the graders.

Thermoid worked with Dr. McClelland. We found there were three things to be considered in making this new conveyor belting: (1) Making belts match the colors specified; (2) Making the belt's surface impervious to fruit mold—also a surface which would be easily sterilized; (3) Making a belt with a surface that would not rub off or discolor the fruit.

Thermoid is the only company licensed to manufacture Dr. McClelland's "Easy on the Eyes" Conveyor Belting. When war time restrictions are lifted, Thermoid will manufacture more of this belting.

This example of problem-solving ability was taken from our files to demonstrate that Thermoid engineering, research and manufacturing facilities—and the services of Thermoid's field representatives—are at your disposal in the solution of *your* industrial rubber problems.

DON'T PUT IT OFF 'TIL TOMORROW *Buy More War Bonds Today!*

Thermoid Rubber

"IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID"

DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: TRANSMISSION BELTING • F. H. P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS

volume of air required for combustion, weight and volume of sizes, weight of ash per ton of anthracite, size range of ash from domestic stokers and from domestic hand-fired anthracite, etc.

Inspection Standards for Bituminous Coal and Lignite Mines, Revised July 1945. U. S. Bureau of Mines. I.C. 7333, 57 pp., 8x10½ in.; paper, mimeograph, free.

•

Coal-Mine Fatality Shows Further Rise

Accidents at coal mines of the United States caused the death of 84 bituminous and 2 anthracite miners in May last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 50,030,000 net tons, the accident death rate among bituminous miners in May last was 1.68 per million tons, compared with 1.45 in the preceding month and 1.74 in May, 1944.

The anthracite fatality rate from accidents in May last was 0.94, based on an output of 2,124,000 tons, against 2.26 in the preceding month and 2.39 in the fifth month a year earlier.

For the two industries combined, the accident fatality rate in May last was 1.65, compared with 1.54 in the preceding month and 1.81 in May, 1944.

Fatalities during May last, by causes and States, as well as comparable rates for the first five months of 1944 and 1945, were as follows:

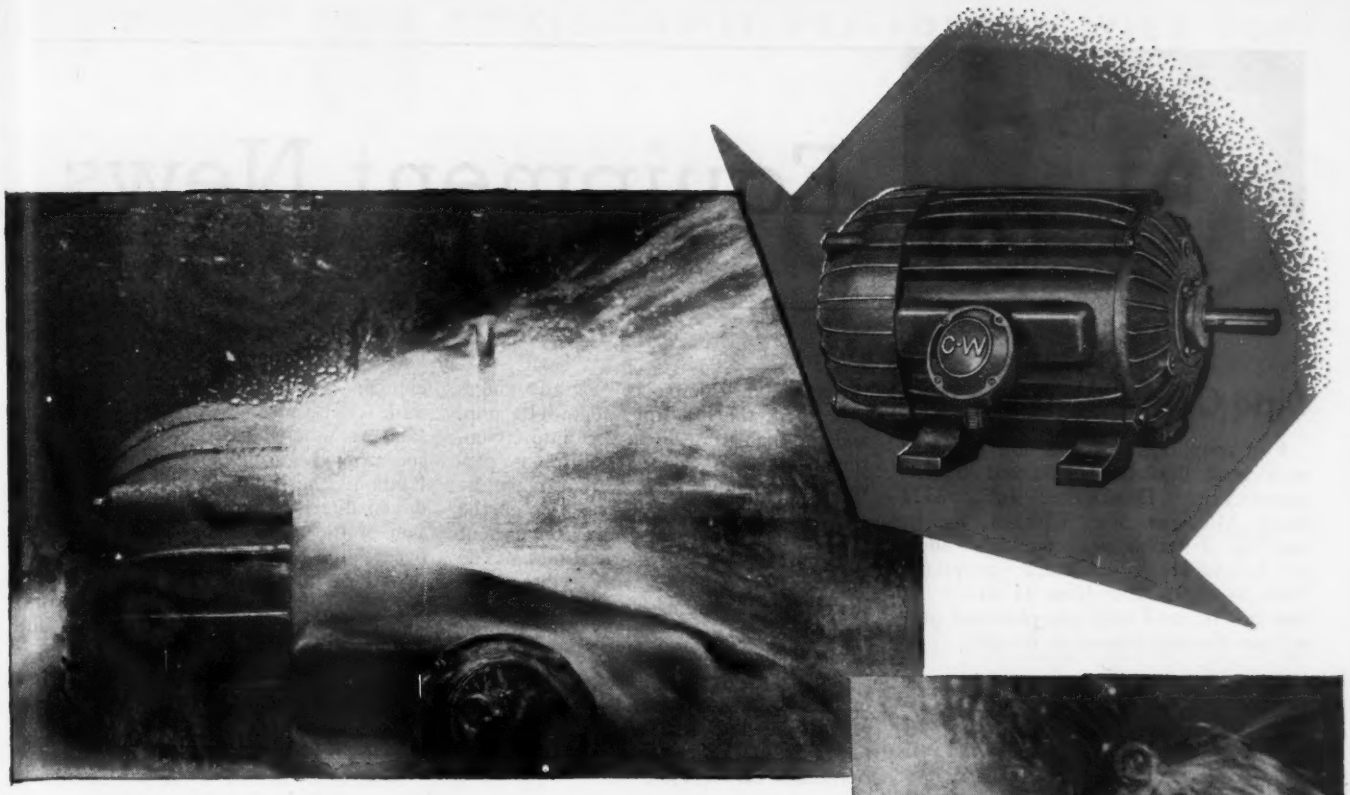
U. S. COAL-MINE FATALITIES IN MAY, 1945, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Electricity	Machinery	Other Causes	Total Underground	Shaft	Open-cut	Surface	Grand Total
Alabama	1	..	..	3	..	..	..	4	..	..	..	4
Colorado	1	..	..	..	..	..	..	1	..	..	..	1
Illinois	2	..	..	..	..	..	..	2	1	..	..	3
Indiana	1	..	1	..	..	..	..	2	..	..	..	2
Kentucky	7	..	1	1	..	1	1	11	..	..	..	11
Missouri	..	..	..	..	..	..	..	..	..	..	1	1
New Mexico	..	1	..	..	..	..	..	1	..	..	..	1
Ohio	1	..	..	..	..	1	..	2	..	..	1	3
Penna. (bituminous)	6	..	2	..	..	1	..	9	..	1	..	10
Utah	1	..	1	23	..	..	1	26	..	..	..	26
Virginia	2	..	1	..	..	..	..	3	..	..	..	3
West Virginia	4	1	9	..	1	1	..	16	..	1	1	18
Wyoming	1	..	..	..	..	..	..	1	..	..	..	1
Total bituminous	27	2	15	27	1	4	2	78	1	2	3	84
Penna. (anthracite)	..	..	..	..	..	..	1	1	..	1	..	2
Grand total	27	2	15	27	1	4	3	79	1	3	3	86

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*
January-May, 1944 and 1945

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945
Underground:												
Falls of roof and coal	248	166	0.935	0.678	41	20	1.489	0.938	289	186	0.988	0.699
Haulage	93	87	.351	.356	10	9	.363	.422	103	96	.352	.361
Gas or dust explosions:												
Local	3	9	.011	.037	1	1	.036	.047	4	10	.014	.038
Major	16	39	.060	.159	...	...	....	....	16	39	.055	.146
Explosives	4	7	.015	.029	8	3	.291	.141	12	10	.041	.038
Electricity	15	6	.057	.024	1	...	.036	....	16	6	.055	.022
Machinery	18	19	.068	.078	...	2	....	.094	18	21	.061	.079
Shaft	4	3	.015	.012	2	1	.073	.047	6	4	.020	.015
Miscellaneous	11	6	.042	.024	7	7	.254	.328	18	13	.061	.049
Stripping or open-cut	9	9	.034	.036	3	2	.109	.094	12	11	.041	.041
Surface	20	21	.075	.086	6	5	.218	.235	26	26	.089	.098
Total	441	372	1.663	1.519	79	50	2.869	2.346	520	422	1.777	1.586

* All figures subject to revision.



A MOTOR takes a bath to prove a point

You can see that this new a-c **SEALEDPOWER** is a unique motor — with many exclusive features—but how will it react to "coal mine" conditions? Can it withstand excessive moisture? What will be the effect of large quantities of coal dust in the surrounding atmosphere?

Answers had to be found to these questions before the motor could be offered for sale to coal mines. So two brutal tests were devised.

In the first test a standard **SEALEDPOWER** motor was placed in a tank containing six inches of water, and run for eight hours without stopping; it was then shut down and the operation repeated the following day. All during the operating period the ventilating fan of the motor continued to throw water over the frame, shields, bearing housings, shaft and junction box (see illustrations), thoroughly drenching the entire exterior of the motor and yet, at the end of the test, the motor was taken apart—and the inside was found to be "bone" dry! Excessive moisture will offer no problem to this motor.

In the second test, a dense atmosphere of French chalk was kept whirling around the motor by means of fans. But, at the conclusion of this test, not a trace of chalk was found on the windings or elsewhere within the motor—conclusive proof that the **SEALEDPOWER** motor is truly dust tight.

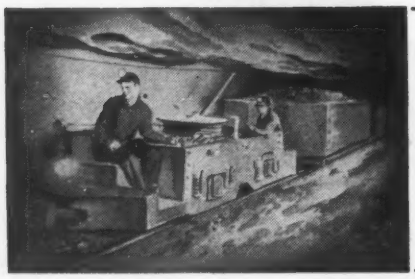
An exclusive Crocker-Wheeler design, the **SEALEDPOWER** motor is suitable for applications where you have been using conventional fan-cooled motors. Why not try one of these motors—in an unusually damp or dusty location? Send for full information or for details of other general-purpose a-c or d-c motors for coal mine service. Please write on your company letterhead — no obligation. CW-5

CROCKER-WHEELER

A DIVISION OF JOSHUA HENDY IRON WORKS, AMPERE 26, NEW JERSEY

Branch Offices: BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • SAN FRANCISCO • WASHINGTON

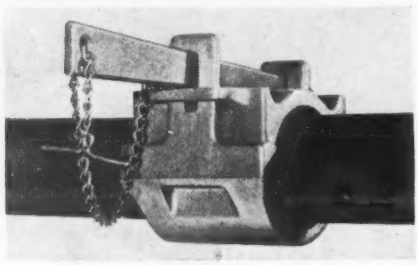
SQUIRREL CAGE MOTORS | WOUND ROTOR MOTORS | DIRECT CURRENT MOTORS | GENERATORS | FLEXIBLE COUPLINGS



Equipment News

Pipe Couplings

Fast coupling of pipe at low cost and with great flexibility is claimed by the manufacturer, Drinkwater, Inc., 2323 South Michigan Ave., Chicago, for its new line of flexible pipe couplings known as Drinkwater Presto-Lock couplings. Made in eleven sizes from 1¼ to 16 in., they can be used with any plain-end pipe without threads, grooves or flanges.



No wrenches or special tools of any kind are required in assembly. Only a hammer is needed to tighten wedge keys after the two sections are fitted over pipe ends and wedge keys have been inserted in the key channels. The procedure, according to the manufacturer, is so simple that even the most inexperienced workmen can assemble these couplings in a matter of seconds.

•

Wrapping Machines

Two Battle Creek wrapping machines originally designed for food packaging have been converted to the packaging of compressed coal for use by the Johnson Coal Cubing Co., Detroit, whose product is sold under the trademark of Koalpak. The heavy-duty construction of the Battle Creek wrapping machine, plus special designing that further strengthened the machine for 24-hour-per-day service in the packaging of coal cubes, was found to be suitable for that type of work. With one operator each machine is capable of wrapping up to 1,800 ten-pound packages of eight cubes each per hour, according to the manufacturer.

•

Transformer Welder

A new 200-amp. Wilson "Bumblebee" a.c. transformer welder of medium capacity incorporates the latest features for economy in power consumption and high speed, according to Air Reduction, 60 East 42d St., New York 17. Self-contained, the new 200 "Bumblebee" has two ranges of current, the low from 30 to 110 amp. and the high from 90 to 275 amp. Continuous stepless current control is provided throughout each current range by simply turning the crank on top of the machine. A full-view scale makes current settings easy to read at all times. The unit also is equipped with a disconnect switch. All windings are covered with spun-glass fiber heat-resistant Class B non-inflammable insulation.

Illustrated leaflet giving dimensions, operating data, electrical characteristics, graphs showing volts and efficiency and power factor percentages and other data is available on request.

•

Lubricant

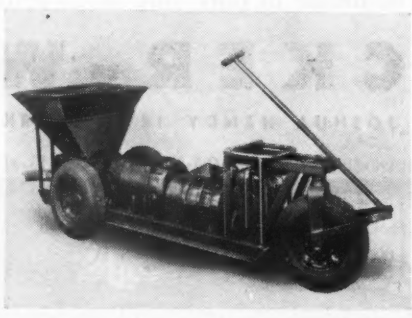
A new internal-combustion-engine lubricant said to have unusual advantages over mineral oil, particularly for cold-weather use, is offered by Carbide & Chemicals Corp., 30 East 42d St., New York 17. The lubricant can be manufactured to any desired viscosity and is wax-free. Pour points vary from —30 to —80 deg. F. Flash points range from 300 deg. F. up. Carbon residue values are less than 0.01 percent, regardless of viscosity, it is stated.

Containing no petroleum oils, the new lubricant practically eliminates sludge and varnish formation in the engine. Compounds are manufactured in two types: water soluble and water insoluble. Greases having unusual high- and low-temperature properties have been prepared from the lubricant.

•

Rock-Duster

A new high-pressure portable rock-duster for mechanical mining, the Bantam, is offered by the Mine Safety Appliances Co., Pittsburgh, Pa. The new unit is said to be capable of discharging dust through 50 ft. of 2-in. hose and yet to be light enough for transport on any type of mine conveyance. All mechanical parts, such as V-belts, speed reducers, agitators and exposed bearings, are eliminated on the Bantam, the only moving parts being driven directly from a double-shaft extension of the motor. The unit is powered by a 2-hp. 1,750-r.p.m. ball-bearing compound-wound dustproof totally inclosed motor of either permissible or non-permissible type which can be furnished in any desired voltage.



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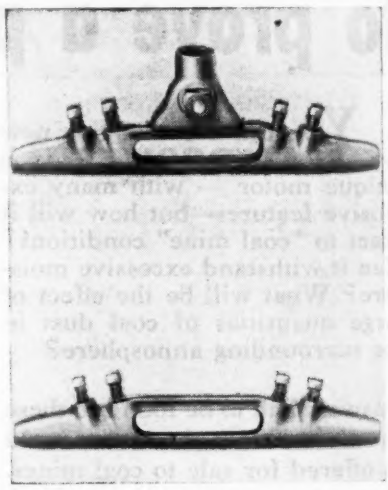
Trolley Splicer

Mosebach Electric & Supply Co., 1150 Arlington Ave., Pittsburgh 3, Pa., offers a new bypass type of trolley splicer. Essentially, it can be supported by a trolley clamp, which is attached to insulator supports, and the trolley. The clamp grips a specially designed bar that is shaped similarly to the groove section of 4/0 or 6/0 trolley wire.



The splicer is equipped with knife-edged approaches to give a smooth under run for fast-moving trolley wheels. This new bypass trolley splicer is made of Mesco bronze and is easily installed, the manufacturer states. It is made in different sizes to accommodate 2/0, 4/0, 6/0 and No. 9 section trolley wires.

•

Tractors

Oliver Corp., Cleveland, has made available a new wheel-type tractor—the Model 70, a 6-cylinder unit of 36 engine hp. Models 80, 60, and 99 are to be added to the line soon, and a complete line of

allied equipment will be available as soon as development can be completed at the Cleveland plant.

•

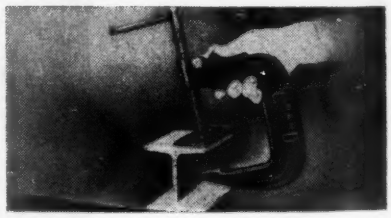
Undercutter

Central Electric Repair Co., Fairmont, W. Va., offers a lathe type commutator undercutter that it states can be quickly adjusted to any lathe from 9 to 26 in. swing. Said to be truly a precision tool and easily portable, it attaches in the same position as the tool post on the lathe carriage. It has full floating slow-speed spindle accurately machined, will cut any desired depth and at the same time slightly bevel the copper bars, assuring all mica is removed from the commutator surface. It uses V-type milling cutters of any desired angle or thickness and from $\frac{1}{16}$- to $\frac{7}{8}$-in. outside diameter with $\frac{5}{16}$-in. hole. It can be set at any desired angle on the lathe carriage and will undercut both parallel and horizontal commutators, the company states.

•

Clamps

Grand Specialties Co., Grand Ave. at Troy, Chicago 22, offers a new line of extra-deep-throat Type C speed clamps. It is asserted that these clamps can be positioned instantly by simply pushing



down on the ratchet screw and tightening with a turn of the loose-proof handle. The clamp is said to release instantly by merely loosening the handle and pushing with thumb or finger on trigger release pawl, which frees the ratchet screw so that the clamp is ready immediately for application to work of any other size or thickness.

•

Cold Setting Plastic

Irvington Varnish & Insulator Co., Irvington 11, N. J., offers a cold setting plastic to be used as a filling material for junction boxes, stuffing boxes, potheads and similar void spaces encountered in electrical work. Known as Cardolite 5616,

FOR a good many years we have talked about how Jones speed reducers, gears and other transmission products have been built for long trouble-free service. Some people might have said that we placed too much emphasis on ruggedness, stamina and the ability of our products to "stand up and take it".

But today in every phase of war work, industry is calling for products that will measure up to these standards by continuously staying on the job.

Our Bulletin No. 80 "Jones Drives for Industry" will give you a complete outline of the range of Jones speed reducers, gears and other transmission products that are built to stand the 24-hour a day drive for victory. We shall be glad to mail you a copy.

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Road, Chicago, Illinois

Jones

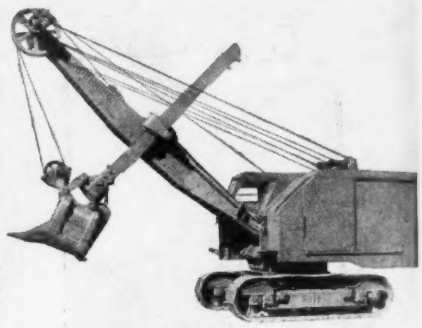
HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

this liquid resin is mixed with Irvington 5612 setting agent prior to use. About four hours after mixing, the two ingredients will gel at room temperature to the point where flow is no longer possible, and after several days the end product is a tough rubbery mass which it is said will not flow under heat nor become brittle in the cold. The set compound is insoluble in water, oil, acids and alkalis. Although it will adhere to metal it can be stripped away cleanly to allow repairs to terminals and cable strips.

•

Shovel-Crane-Dragline

A new 1¼-yd. shovel-crane-dragline, the Koehring 605, offered by the Koehring Co., Milwaukee, stresses ease of operation, basic strength, simplicity and quick convertibility. Main drum clutches are said to be of new, improved design; power engaged but manually released; they enable the operator to retain the "feel" of the load at all times. Independent power or live boom control or a combination of both are available.



The shovel dipper trip is of the pawl-and-ratchet type. Main shafting is straight; separate crawler frames are said to give the lower assembly added flexibility. The boom has an improved shock absorber; a simplified shipper shaft assembly is designed to be easily removable.

•

Welding Film

A liquid designed to minimize the adherence of welding spatter to metal and reduce cleaning time is offered by the Lincoln Electric Co., Cleveland, Ohio. Known as "Non-Spatter" film, the liquid has been thoroughly tested in the field and found to possess the following characteristics, according to the maker:

Welding can proceed after application, whether the film is still wet or dry.

Film can be sprayed or painted on work.

Priming coats of paint may be readily applied over the film.

If it is desired to remove the film before painting, this can readily be accomplished by washing with water.

One application of film is effective for multiple-pass welding.

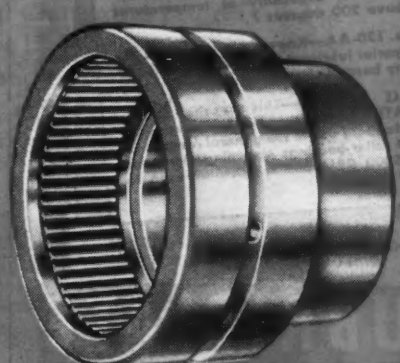
If film is sprayed or painted on parts prior to being normalized, the oxide film and ordinary scale can be removed more easily after heat-treating.

Material will freeze but freezing has no

Goodman PROTECTS CRITICAL WEAR SPOTS

Orange Roller Bushings in two clutches and main transmission help this Goodman Track-Mounted Loader maintain a consistently high loading rate.

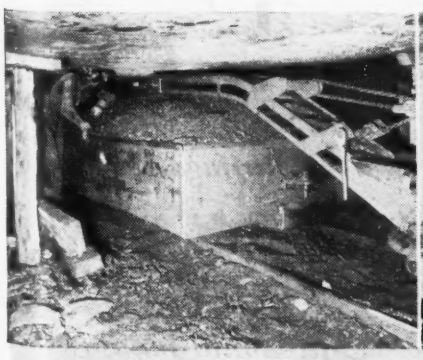
WITH ORANGE ROLLER BUSHINGS



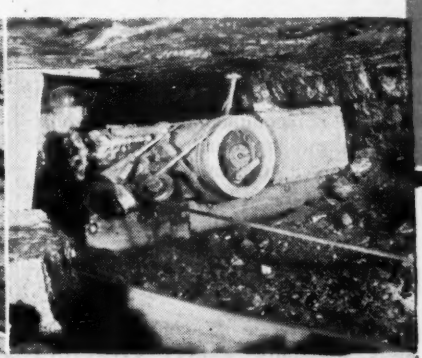
It's no easy matter to make replacements and repairs on underground mining equipment. That's why Goodman Mfg. Co. emphasizes trouble-freedom in building its mining machinery and selecting parts for it. That Orange Roller Bushings meet these strict standards in the transmissions, planetaries and conveyor shafts is confirmed by Goodman's report—"trouble-free service over long periods of time."

The smooth, quiet, long life operation that characterizes Orange Roller Bushings under severe loads and gruelling conditions, is due to their closer internal running clearances which keep the rollers in alignment with the highly finished raceways. Maintaining dimensional uniformity of rollers to extremely close tolerances makes this construction possible. Write for the complete engineering data book showing designs, sizes, capacities, installation data, etc.

ORANGE ROLLER BEARING CO., Inc. 564 Main St. Orange, N. J.



Orange Roller Bushings prevent wear on the drive and driven shafts on the slack conveyor of the Goodman Type 724 Track-Mounted Cutting Machine.



Twelve Orange Roller Bushings take heavy shock loads in the planetaries that control the wire rope drums of this Goodman Shortwall Machine.

Mail Coupon for Engineering Data

Orange Roller Bearing Co., Inc., CA
Orange, N. J.

Please send me your Roller Bushing Data Book

Name ..... Title.....

Company.....

Address .....

City..... State.....

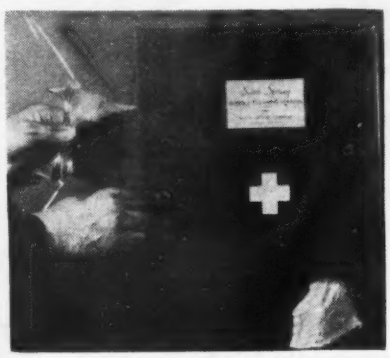
effect on its properties when thawed out.

"Non-Spatter" film is supplied in concentrated form in 5-gal. cans. By diluting the concentrated material with three parts of water, 20 gal. of film fluid is obtained. Either brush or air gun can be used to apply the film to the areas adjacent to the joint to be welded and to welding jigs that may be subjected to spatter. After welding, the spatter can be removed easily by wiping or brushing.

•

Goggle Cleaner

Allen Optical Co., Buffalo 2, N. Y., offers its goggle station and Sani-Spray goggle cleaner for industrial use. The goggle station is a self-contained heavy-duty steel atomizer cabinet holding a quart jar (refillable) of Sani-Spray, a supply of



tissue paper and a built-in receptacle for used cleaning tissues. Simple pushbutton control releases a fine mist of Sani-Spray from an orifice on one side of the cabinet. Sani-Spray not only cleanses but also fog-proofs goggles.

•

Electrodes

For speedy and economical welding in all positions and with a.c. and d.c. reverse polarity, the new ACP electrode available in seven diameters from $\frac{5}{16}$ to $\frac{3}{32}$ in. is offered by the Westinghouse Electric Corp., East Pittsburgh, Pa. The new heavily coated electrode, recommended for high-quality welds on work not easily positioned, forms a light porous slag easily removed from each pass by light brushing. Because of high tensile strength and ductility of welds made with ACP, this rod is said to be especially suited for heavy plate fabrication and general structural steel work.

Easy to handle on vertical and overhead work, ACP is recommended for horizonal fillet welds and lap joints on all low and medium carbon steels as well as low-alloy and cast steels.

•

Electric Marker

A new electric marker offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill., 6 in. long and 10 oz. in weight, can be used continuously on the toughest of marking jobs, it is said. Though the power of the cutting

stroke is said to have been increased by 30 percent over previous models, an adjusting nut makes it possible to vary the impact so that it can even be used to mark on glass. Operating from any a.c. electrical outlet like a small electric hammer, it makes 7,200 cutting strokes per minute, cutting right into the surface, leaving lines that cannot be wiped away or worn off with ordinary usage.

•

Sweatband

An absorbent sweatband specially designed for welders and workers on hot jobs is offered by the American Optical Co., Southbridge, Mass. It is made from synthetic sponge, 7¼ in. long, that covers the greater width of the brow. By keeping sweat out of the eyes and off goggles, the sweatband helps reduce the possibility of accidents from blurred vision.

•

Electric Motor

A new feature in electric motor design, the prelubricated sealed ball bearing, has been applied by engineers of Westinghouse Electric Corp., East Pittsburgh, Pa., to eliminate the necessity for greasing except at intervals of five years or longer. This new bearing consists of the standard single row of balls mounted in races of the same width as the double-row ball bearings. Metal shields are anchored solidly in the outer race near the outer edges and extend down and inward to a close running clearance from the inner race. Adequate space for grease is thus provided and at the same time there are highly effective seals against the leakage of grease and entrance of dirt.

This construction gives several operating advantages: the tightly sealed inclosure reduces oxidation of the grease, thus promoting longer grease life; maintenance expense is sharply reduced as frequent greasing is not required; grease is kept in and dirt is kept out; when motors are disassembled the bearings, being inclosed in a cartridge, are protected against dirt. Furthermore, the always present hazard of overgreasing and the consequent grease seepage into windings is eliminated.

•

Car Unloader

S. P. Kinney, engineers, 233 Oliver Ave., Pittsburgh 22, Pa., have designed and put into operation a mechanical railroad-car unloader for which a considerable labor saving is claimed. The unloader consists principally of a movable bridge equipped with a trolley that carries an unloading ram. The bridge is of special design to fit local conditions and may run on a crane runway or may be designed as a gantry or other suitable type of bridge for operation over one or more tracks. The combination of the bridge and trolley travel provides a means of locating and operating the unloading ram over any point in a car.

This unloader operates efficiently on cars with cross bracing. The unloading

"HERCULES" (Red-Strand) Wire Rope

For *Every* Heavy Duty Purpose

All wire ropes do not operate under the same conditions: Some must be extra flexible; some are subjected to excessive wear and stress; and there are many uses where a combination of severe conditions must be met.

In order to be suitable for every heavy duty purpose, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of constructions—both Round Strand and Flattened Strand—all of which can be furnished either Preformed or Non-Preformed. A "mis-fit" rope, either in type, construction or quality, will definitely increase operating cost.

Moreover "HERCULES" is made of carefully selected and rigidly tested materials. Modern facilities, long experience and advanced manufacturing methods insure correct fabrication.

When you adopt the Red-Strand as your wire rope guide, you are assured of dependable and economical results.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

procedure consists of first opening the bottom doors of the hopper car and then bringing a heavy power-driven ram equipped with a spade-type tool over a location on top of the cargo directly above the open door of the hopper car. The ram is then driven downward through the open door, pushing material with it and making an opening. The tool is again rammed into the material and oscillated to push it to the car-door opening. The oscillation is effected by a swinging movement of the ram and also by moving the bridge carrying the ram. The material lying on the slope at the ends of the car is easily pushed to the door opening by the spade.

•

Industrial Notes

JOSHUA HENDY IRON WORKS has appointed Charles A. Butcher, formerly manager of the Pacific Coast manufacturing and repair department of the Westinghouse Electric & Mfg. Co., as assistant general manager of the Crocker-Wheeler Division, Ampere, N. J.

THERMOID CO., Trenton, N. J., has elected John Owen as assistant vice president. Formerly an executive of Austin Western Co., he joined Thermoid in 1942. He will continue as manager of the industrial rubber division.

HERCULES POWDER CO., Wilmington, Del., has named William C. Hunt as an assistant general manager of the explosives department, and Harry V. Chase will succeed Mr. Hunt as director of operations.

RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, has elected A. S. Knoizen a director, vice John D. Fackler, resigned, but who remains as legal counsel. Mr. Knoizen, who is director of the Mining Division of the War Production Board, also is executive vice president of the Joy Mfg. Co. and the Sullivan Machinery Co.

FEDERAL MACHINE & WELDER CO., Warren, Ohio, has elected as vice president in charge of engineering J. F. Joy, formerly director of engineering. Inventor of the Joy coal loader, Mr. Joy previously served the Office of Chief of Ordnance, U. S. Army, where he received a citation from the War Department for meritorious service.

MINNEAPOLIS-HONEYWELL REGULATOR CO., reorganizing its controls division for postwar sales, has appointed T. S. Carley as assistant sales manager of stoker controls with headquarters in Minneapolis.

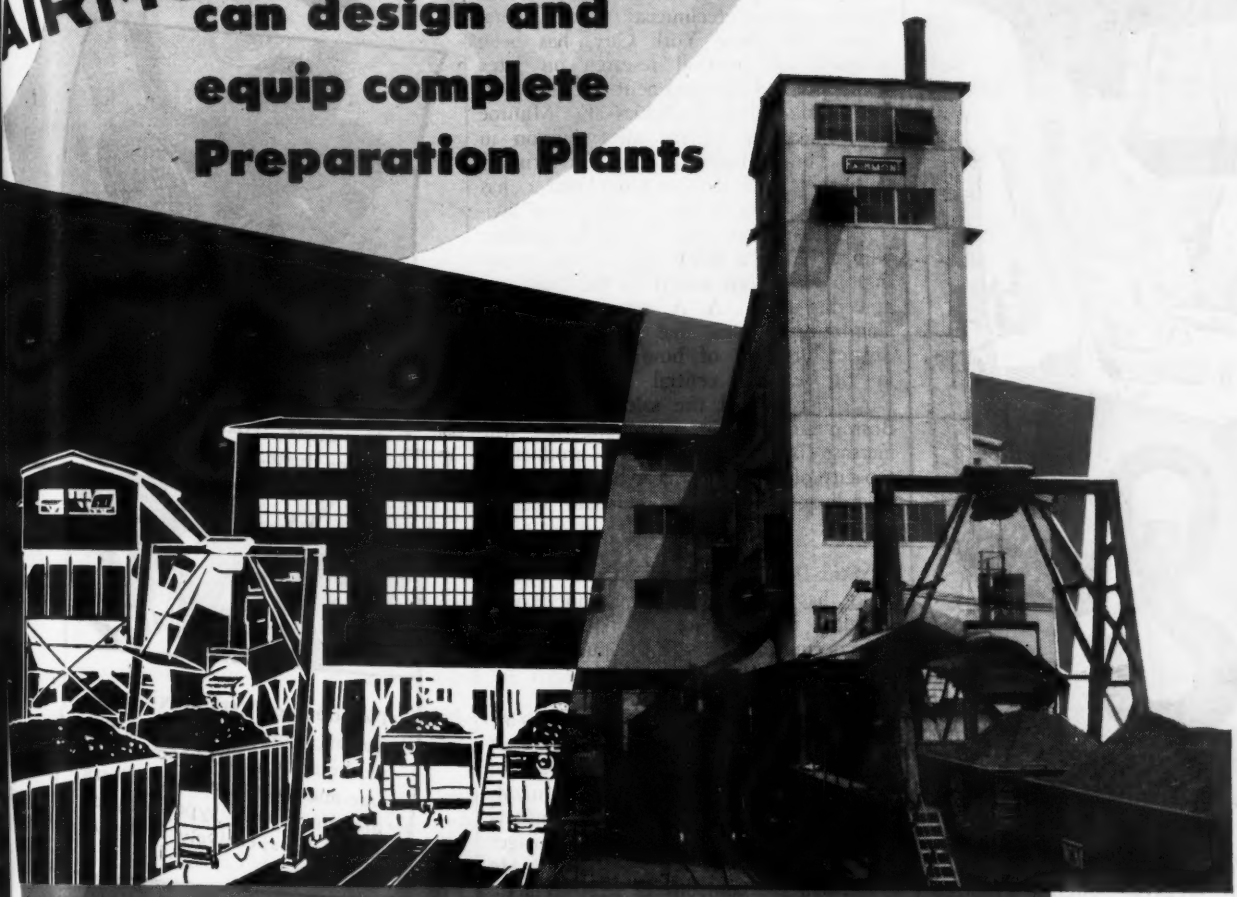
MARION STEAM SHOVEL CO., Marion, Ohio, has appointed Axel W. Hedberg as works manager. He recently resigned as St. Clair division branch manager of Parker Appliance Co., Cleveland, Ohio.

AHLBERG BEARING CO. has moved up Glenn Sayther to be branch manager at Minneapolis. Associated with the company since 1929, he takes the place of Ray F. Landis, who resigned.

HEWITT RUBBER CORP. has moved Lester D. Bigelow, vice president, to Chicago to supervise midwest sales. Frank W. Blanchard has been promoted from chief engineer to factory manager in charge of

From blueprint... to Production

FAIRMONT can design and equip complete Preparation Plants



Is there a question in your mind regarding the method of cleaning and preparation best suited to your product? Turn your problem over to FAIRMONT . . . we'll assume full responsibility in every detail, right from the drawing board stage to completion of the preparation system. Get the most from your product — boost your plant efficiency — make certain that your coal will compete successfully at premium prices.

FAIRMONT offers both Wet and Dry cleaning methods — the Chance Sand Flotation System for Wet Cleaning and the American Pneumatic Separator for Dry Cleaning — to meet every preparation need, regardless of coal type or composition. Call in a FAIRMONT Engineer . . . he'll be glad to advise on the method of preparation that will be of greatest benefit to you.

FAIRMONT MACHINERY CO., FAIRMONT, W. VA.

TRADE MARK REGISTERED

FAIRMONT MACHINERY COMPANY

all production in both Buffalo plants. Clayton H. Skinner has been advanced from plant engineer to chief engineer. T. C. Zinter, technician since 1919, has been named manager of belt sales and development. Harold C. Patterson, former assistant sales manager, has been appointed manager of hose sales and development. R. G. Mack, formerly with the Sponge Aire Seat Co., Buffalo, has joined the latex foam product division. Stewart Ogilby, former technician with General Cable Co., New York City, has been assigned to chemical research on latex foam product development at the Buffalo main plant. Charles F. Munroe has joined the eastern sales division in New York. Larry Burmester, formerly with the Gates Rubber Co., Denver, has been appointed to the Pacific Coast division in San Francisco. Frank B. Speaker, who served as a WPB engineer in Washington, has been added to the field engineering staff. A. A. (Fred) Beaulieu, Cambridge, Mass., has been named a district manager of hose and belt sales in the eastern central States. James Doyle has joined the sales staff in the Boston area. New equipment that will increase by 50 percent the production capacity of the company is to be installed, according to Frank W. Blanchard, factory manager.

MAGK-INTERNATIONAL MOTOR TRUCK CORP. has appointed H. E. Seanor as vice president in charge of export sales. He will continue to manage the public works and mines division.

WESTINGHOUSE ELECTRIC CORP. has appointed Harry L. Huntley as headquarters repair sales manager of the 34 plants of the manufacturing and repair department. He joined the company in 1926. Andrew H. Heywood has been appointed manager of the motor application department. He also joined the company in 1926. Harvie L. Sykes Jr., an illuminating engineer for the Jersey Central Power & Light Co. since 1940, has joined the Middle Atlantic District of the Westinghouse Lamp Division as district engineer.

NORMA-HOFFMANN BEARINGS CORP., Stamford, Conn., has appointed R. L. Miller as sales manager; E. M. Beers Jr. and G. V. Titsworth, assistant sales managers; C. L. Brown Jr., assistant to the sales manager, and W. G. Sargent, manager of distributors' sales. The changes were consequent upon the resignation of Carl W. Hedler as western sales manager and manager of distributors' sales.

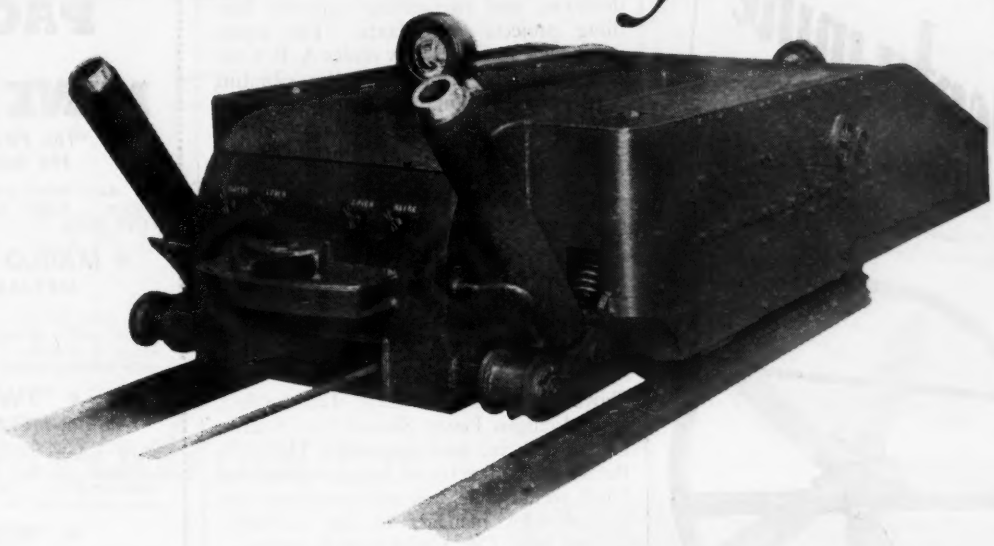
STAR ELECTRIC MOTOR CO., Bloomfield, N. J., has appointed Paul J. Moore as motor sales manager. He had been sales manager of the Imperial Electric Co. since 1944, when he left the General Electric Co. after many years in the motor division.

ROBINS CONVEYORS, INC., Passaic, N. J., has reorganized its sales department, which continues under the direction of Harold Von Thaden, first vice president. Under the new plan, E. C. Salzman, vice president, formerly in charge of sales, assumes responsibility for all export operations, with headquarters at 70 Pine St.,

Save $70 a day . . .

BY USING THE NEW BROWN-FAYRO POST PULLER

Brown-Fayro has developed a new machine to recover props and headers in worked-out sections of coal mines.



Save Labor - Save Coal - Save Cost

A Pennsylvania coal operator reports that during the entire period for which records were kept, the value of recovered posts, crossbars, rails and planks exceeded by 70 dollars a day the labor cost of operating his machine.

The Brown-Fayro Post Puller has been designed for the specific duty of salvaging timbers from worked-out sections. These necessary features are included.

TWO-SPEED TRANSMISSION—gives a dislodging rope pull of 20,000 lbs. at 10 ft. per minute, and a drag-out speed of 100 ft. per minute. ¾" wire rope is used.

HYDRAULIC CONTROL—results in ease of operation and keeps the maximum pull within the safe loading of the rope.

FRICTION CLUTCHES—provide rapid and shockless change from dislodging to drag-out speeds.

HYDRAULIC JACKS—anchor the machine in position quickly and effectively without straining any machine parts. Removable jack extensions can be made for various roof heights.

PERMISSIBLE CONSTRUCTION—all electrical equipment is explosion-proof.

TRACK MOUNTED—suitable for 36" and wider gauges.

SELF-PROPELLED—equipped with auxiliary trolley pole for use where ventilation permits.

CABLE REEL—power driven, capacity 500′ No. 8 three conductor cable, can be furnished if desired.

TAIL ROPE DRUM—where timber recovery methods require a tail rope to pull out the main rope, an auxiliary drum is placed at front end of machine.

DIMENSIONS—Length over bumpers—12′ 6"; width of frame—5′ 3"; height to top of frame—28"; weight without accessories—8000 lbs.

Write today for detailed data on Model HP Post Puller. Other Brown-Fayro products: Car Spotters, Portable Blowers, Gathering Pumps, Room Hoists, Mine Cars and Parts, Car Retarders, Rerailers, and Sheaves.

THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA

New York City. Moving to Passaic from the Chicago office, which was under his charge, J. F. Meissner, vice president, takes over control of all engineering sales and of the field engineers who devote their time and attention solely to the functions of designing and engineering materials handling projects and plants. The equipment sales section is now under A. E. Conover, formerly manager of the vibrating machinery division. His responsibilities include direction of that portion of the field engineering staff concerned with the sale of equipment, where little or no engineering is involved. Sales research and training has been put under T. W. Matchett, secretary of Robins Conveyors, Inc.; advertising and sales promotion remain under E. M. Perrin; the engineering department continues to be headed by R. W. Eichenberger, vice president.

LIMA LOCOMOTIVE WORKS, INC., Shovel and Crane Division, Lima, Ohio, and Michigan Power Shovel Co., Benton Harbor, Mich., have appointed Hugh H. Buchanan as director of foreign operations. Until recently he was vice president and general sales manager of the LaPlante-Choate Mfg. Co., Cedar Rapids, Iowa.

ELECTROMODE CORP. is the new name recently adopted by the Electric Air Heater Co., Mishawaka, Ind.

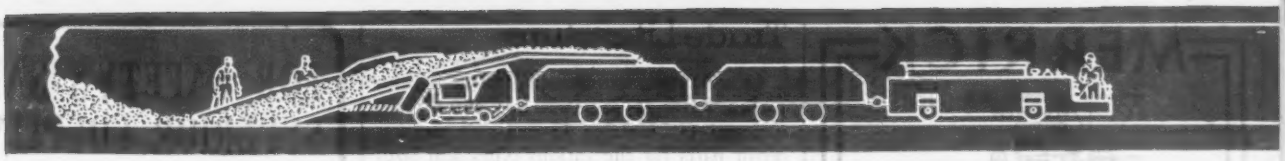
WORTHINGTON PUMP & MACHINERY CORP. has named as vice president in charge of engineering for the entire corporation Harry A. Feldbush, formerly works manager of the Holyoke (Mass.) plant. His headquarters will be at the general offices in Harrison, N. J. Ralph M. Watson, formerly chief engineer of the centrifugal engineering division, has been appointed assistant to Mr. Feldbush.

LINK-BELT CO., Chicago, has appointed A. C. Fellinger as sales manager, power transmission machinery, with headquarters at the Ewart plant, Indianapolis. He succeeds C. Walter Spalding, deceased. H. F. R. Weber has been made divisional sales manager, silent chain drives, with headquarters at the Ewart plant. Sales through Link-Belt distributors will be supervised by F. A. Hurd, divisional manager, industrial distributor sales, Chicago; G. H. Unruh, divisional manager, industrial distributor sales, Philadelphia, and Harry Reisser, divisional manager, automotive equipment sales, Indianapolis.

PORTABLE PRODUCTS CORP., Pittsburgh, Pa., has elected John C. Sykora as vice president and director of sales for all divisions, with newly established headquarters in the Woolworth Building, New York City. He formerly was vice president and sales manager for the industrial division of the Gould Storage Battery Corp., Depew, N. Y.

RELIANCE ELECTRIC & ENGINEERING Co., 1088 Ivanhoe Road, Cleveland has appointed as general manager Fred E. Harrell, chief engineer for the last two years. He succeeds S. B. Taylor, who has resigned as manufacturing vice president but will remain a director. William R. Hough succeeds Mr. Harrell as chief engineer.

E. G. GELLATLY, 45, conveyor specialist, Jeffrey Mfg. Co., Pittsburgh, Pa., died July 7.



Built to Fit Your Loaders and Your Headroom

AMONG THE MANY CAR DESIGNS DEVELOPED BY

Enterprise

there are likely to be some which fit your conditions.

The cars illustrated, for instance, show some types which we have built for mines operating seams with low headroom.

However, our engineers are available to work with you on special car equipment to meet your particular requirements.

Your inquiry will be appreciated.

ENTERPRISE

WHEEL & CAR CORPORATION

BRISTOL, VA.—TENN. HUNTINGTON, W. VA.

Trade Literature

JACK MAINTENANCE AND REPAIR—Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44. Catalog 45 lists and pictures repair parts for the various types and sizes of Simplex jacks, including a complete list of interchangeable parts. This book not only facilitates ordering of replacement parts but also presents valuable suggestions for the maintenance, lubrication and repair of Simplex jacks. Types covered include automatic lowering, mine timbering, car siding, geared, cable reel, cable tensioning, pole pulling, mine-post pulling, pull rod, track, pipe pulling and pushing, journal, rail pulling and expanding, push and pull, mine roof and hydraulic jacks.

EXCAVATING AND MATERIAL-HANDLING EQUIPMENT—Bay City Shovels, Inc., Bay City, Mich. Catalog L shows applications, with minimum text and only necessary specifications to designate size and capacity, permitting quick determination of the right size and capacity machine for nearly any job. Descriptions illustrate a few of the many outstanding operating advantages such as the convertible features of the crawler models where they are shown in operation as shovel, crane, clamshell, dragline and hoe; CraneMobile section shows clear-cut automotive design of special crane carrier and adaptability to handle long booms and jibs.

NON-FERROUS METALS — Wellman Bronze & Aluminum Co., 2553 East 93d St., Dept. P, Cleveland 4. Catalog gives metal data helpful in redesigning old or developing new products. Tables cover "Relative Weights of Structural Metals"; "Physical and Mechanical Properties of Cast Metal"; "Chemical Compositions and Mechanical Properties of Magnesium-, Aluminum- and Copper-Base Alloys and Ampco metal"; conforming specifications, etc.

MINING MACHINERY—Lake Shore Engineering Co., Iron Mountain, Mich. Catalog 451, on skips and cages, describes in detail 13 different types of skips and seven different cages, with construction features. The Lake Shore combined skip and cage also is shown, as well as dump plates, angles and other mining machinery.

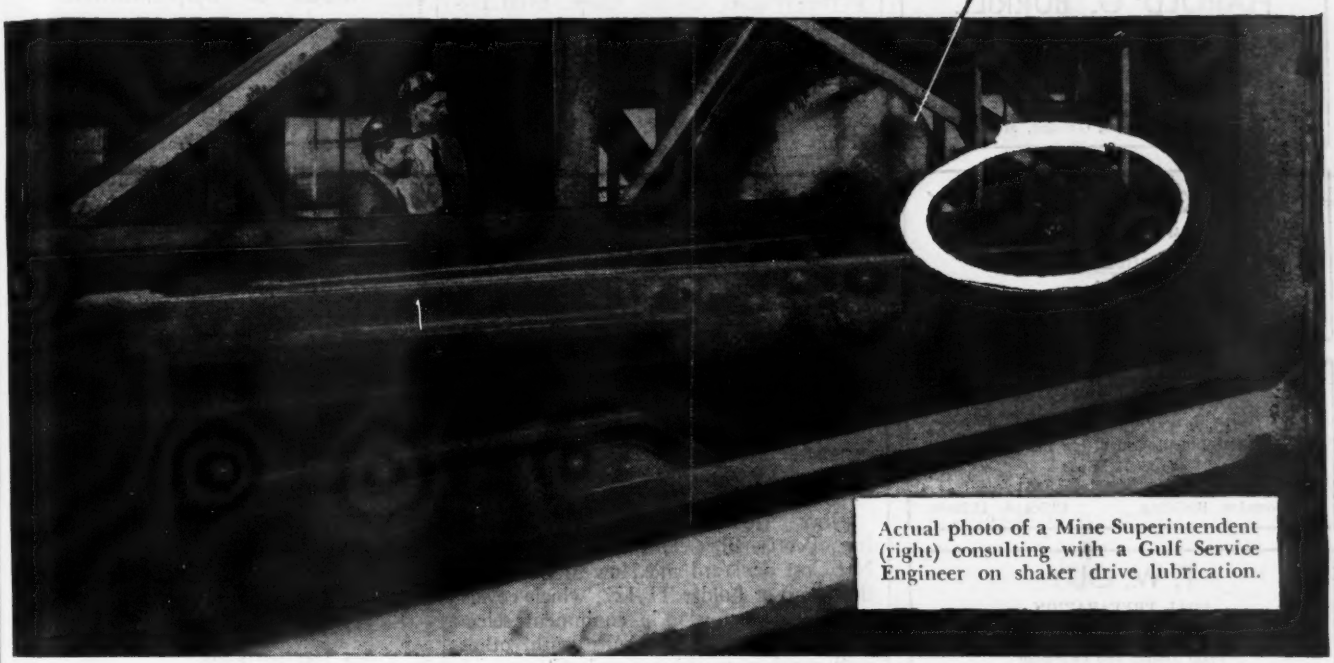
PRODUCTS DIRECTORY—Allis-Chalmers Mfg. Co., Milwaukee. Directory of products and engineering literature lists more than 1,600 product types. New products added since the previous directory, such as induction and dielectric heating equipment, are indicated by a star for easy identification. Bulletins offered are written by engineers who are outstanding authorities in their respective fields. In most cases the literature contains operating data, charts, formulas and technical information of value to the man who specifies and buys equipment.

ELECTRONICS — Allis-Chalmers Mfg. Co,. Milwaukee. Booklet E6358, "Introduction to Electronics," prepared by Dr. Walther Richter, contains a brief discussion on the fundamentals of conversion and control of electric power in a load prefacing introduction of the subject of

"GULF ENGINEERING SERVICE

helped us improve shaker drive lubrication— now we save a lot of money on eccentric strap maintenance"

says this Superintendent



Actual photo of a Mine Superintendent (right) consulting with a Gulf Service Engineer on shaker drive lubrication.

"WHEN THE ECCENTRICS on our shaker drives were lubricated by the usual method, the straps overheated and wore out quickly. By adopting the lubrication method suggested by this Gulf Service Engineer, we put an end to this trouble," says this mine Superintendent. "Now we save a lot of money on eccentric strap maintenance, and avoid costly delays in the operation of shaker drives."

Another typical example of how Gulf Service Engineers help mine operating men increase tonnage and reduce maintenance costs! Here's why scores of mines keep Gulf Service Engineers "in the picture": These specialists in scientific lubrication have a background of thorough training and broad, practical experience with all types of coal mine equipment. They know how to get top performance from every unit by the selection of the proper lubricants and methods of application.

A Gulf Service Engineer will gladly cooperate with you to set up the kind of lubrication practice in your mine that will insure less wear on equipment, lower maintenance costs for haulage locomotives, etc., and increased tonnage output. Write, wire, or phone your nearest Gulf office today and ask a Gulf Service Engineer to call.

GULF OIL CORPORATION · GULF REFINING COMPANY

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta

New Orleans · Houston · Louisville · Toledo

GULF INDUSTRIAL LUBRICATION

electron tubes. The book explains that the electron tube is a new control element that is nothing but a special type of rheostat or switch. The discussion of tubes is divided into two main parts: vacuum and gaseous. Differences between a vacuum tube and the equivalent mechanical device, method of specifying tube performance, application of tube characteristics for design purposes and use of the high-speed response of the tube are explained. Clearly presented are principles of tube-detector action with applications and principles of tube oscillators with application to induction and dielectric heating.

ELECTRICAL AND AUTOMOTIVE PRODUCTS—Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14. Folder Form GU-86 describes briefly entire line of electrical and automotive products: motors, transformers, industrial brakes and controls, bydraulic brakes, air brakes, tachographs (speed-recording speedometers), NoRol, brake lining and brake-service tools.

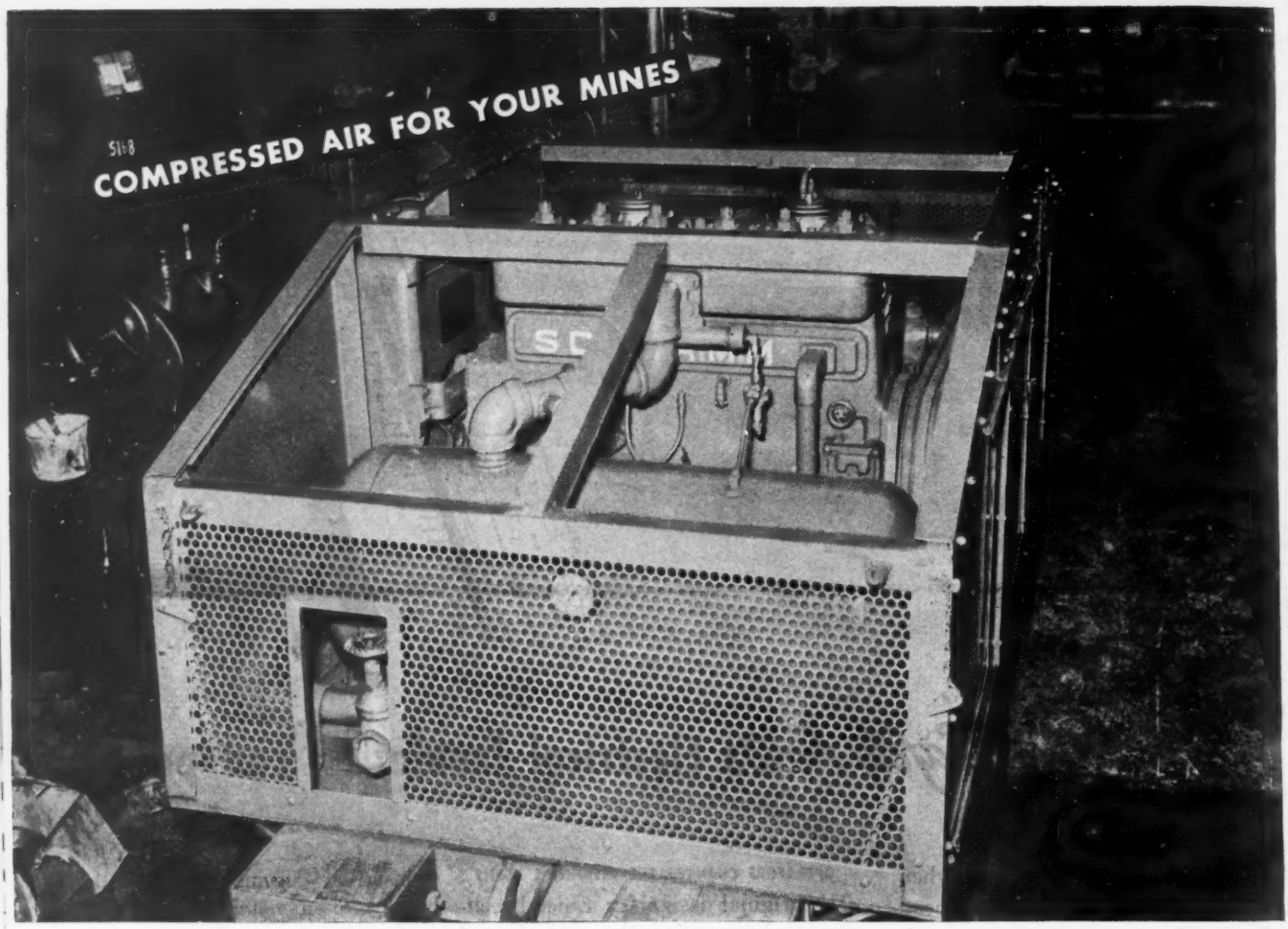
MAGNETIC MINE STARTERS—Ensign Electric & Mfg. Co., Huntington, W. Va., and Clark Controller Co., Cleveland, Ohio. Bulletin 5390 emphasizes features with general description of mine starters designed specifically to meet the requirements of the coal mining industry—suitable for use with shunt or compound-wound d.c. motors on such drives as mine conveyors, gathering pumps and similar applications.

DIRT MOVERS—R. G. LeTourneau, Inc., Peoria, Ill. "Dirtmoving at Lowest Net Cost per Yard and How to Get It" is the name of Folder TP-122, which covers two major factors: (1) equipment selection—compares Tournapulls with other earth-moving machines; and (2) sound operating job methods. It shows profitable Tournapull applications on roads, airports, dams, reservoirs, railroads, mines and other current jobs.

FLASHLIGHT BATTERY—Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. Folder stresses these as advantages of the Ideal rechargeable flashlight battery: 40 percent greater discharge capacity; stronger, tougher case for hard wear; brighter, longer sustained light volume; savings up to $10 a year; outlasts 400 or more dry cells.

TRACTORS—Caterpillar Tractor Co., Peoria 8, Ill. Booklet Form 8997, "In Mine, Pit and Quarry With Caterpillar," discusses cost-cutting, production-boosting methods for mine operators. It stresses the need for steady, economical power in unearthing nature's treasures, handling and transporting, and processing to convert them to a usable state.

SYNTHETIC RUBBER—B. F. Goodrich Co., Akron, Ohio. Catalog Section 8000 outlines in detail the properties of Ameripol D, and oil- and heat-resistant synthetic rubber. A page table gives the property relation of natural and various types of synthetic rubber. Other tables list the properties of typical commercially available Ameripol D compounds,



Exclusive SCHRAMM OFFERS THESE COMPRESSOR-ECONOMY FEATURES

Four features make Schramm Air Compressors ideal for *any* compressed air job in your mine . . . (1) 100% water cooled; (2) Compact—lightweight; (3) Mechanical intake valve; (4) Forced feed lubrication. These features enable you to do your compressed air jobs quickly—easily—economically!

Schramm Compressors are designed for heavy duty, continuous service, with minimum attention. They are built in sizes ranging from 20 to 600 cu. ft. displacement, in every type of mounting and assembly.

Illustrated is a Schramm mounted in a mine car . . . to go right into the mine. Stationary and portable compressors of all sizes are available. The future of mining is great. Make your mining *easier* by using Schramm Air Compressors. Write today for construction details of these compact, sturdy units.

This Stands for Honorable Service for Our Country

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

No Time Off for LOADERS

● *Built by* THE JEFFREY MFG. CO.

There's no vacation for the SKF Bearings on vital moving parts of this Jeffrey Coal Loader. Every hour of every day is filled with dependability. And this goes on for years because inherent alignment prevents binding of SKF Bearings—assures equalized load distribution and peak load carrying capacity. No adjustments are needed, and lubrication consumption is low. From working face to furnace, coal moves swiftly on machines that are SKF-equipped.

5850

SKF INDUSTRIES, INC., PHILA. 34, PA.

Flash — On every competitive test to date, LaPlant-Choate's new 8-yard cable-operated scraper has "run rings around" all other competitive scrapers tested. A limited number are already in the field, with everything set for economical mass production as soon as military conditions permit. You'll agree — it's a scraper well worth waiting for!

THOUSANDS OF SATISFIED OWNERS AGREE

It's LPC *for* LOWEST POSSIBLE COST

TRADE MARK

There are many good reasons why thousands of successful operators who have been using LaPlant-Choate rigs for years will keep right on buying them after the war. For one thing, these long-time users know from experience that LPC dozers and scrapers consistently move more yardage faster and at lower cost. They also know that LaPlant-Choate performance and dependability have been *job-proved around the world* under all types of conditions. And best of all, these veteran operators know that LaPlant-Choate will continue to lead the way in developing new improvements because LPC's entire organization is *strictly "tractor-equipment-minded"* . . . with more years of specialized "know-how" than any other company in the industry. So it all adds up to LPC—for lowest possible cost and better results—on your jobs, too. See your LPC-"Caterpillar" distributor today. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; San Leandro, California.

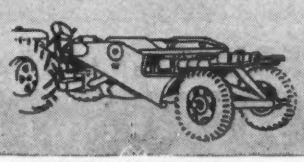
ARMY E NAVY

LAPLANT CHOATE

EARTHMOVING AND LAND CLEARING EQUIPMENT

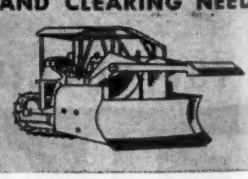
THERE IS A JOB-PROVED LA PLANT-CHOATE RIG FOR EVERY EARTHMOVING AND LAND CLEARING NEED

ALL TYPES OF DOZERS — Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS — Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.

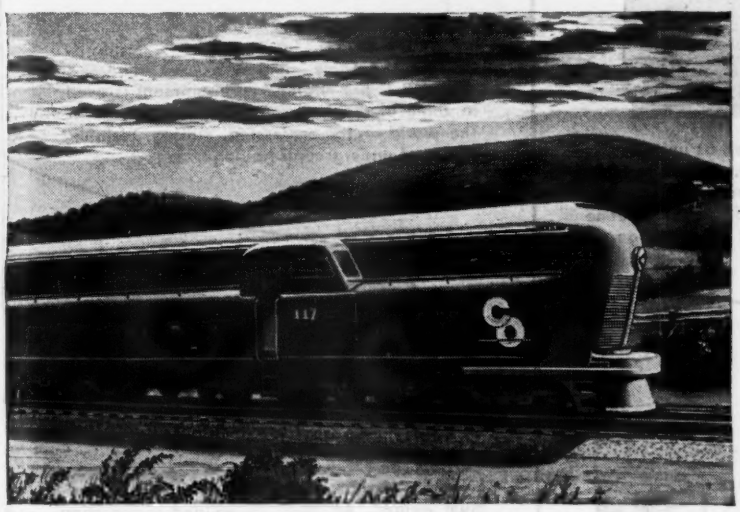
CABLE OPERATED RIPPERS — For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.



LAND CLEARING TOOLS — A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

Nylon Hose—made from coal. Making them will make jobs.

Fireproof table-tops made from coal. More jobs in the making!



The new, fast, coal-burning, steam-turbine electric—big source of jobs.

Power to turn postwar wheels. More jobs from coal.

How Many Postwar Jobs—from Coal?

WHAT OPPORTUNITIES will there be for jobs after the war? Jobs for returning soldiers, sailors, war workers?

No one can say, exactly. But this much is known: business is planning to meet quickly the demand that will exist for all sorts of things after victory—and out of which jobs will come.

Take the coal industry. Not only will coal continue as one of our basic sources of power, but from coal research have come a host of new products, even further increasing its use.

Before the war, nylon was made from coal. So were the life-saving sulfa drugs. During the war, new medicines, chemicals, plastics and things beyond imagining have grown from research in coal.

Postwar, you will find sheer, wrinkle-proof dresses made from coal. Sturdy shoes made from coal. Shimmering, fireproof table-tops made from coal. There are even revolutionary locomotives—including the C & O-planned steam-turbine electric—that operate on coal and develop undreamed-of smoothness and efficiency.

All this will increase the demand for coal—and demand for goods makes jobs.

After the war, there will be lots of opportunities. So, if you are on a war job, stay on it until Uncle Sam says it's finished. Victory must come first.

If you have a war job, stay on it—there'll be lots of opportunities after Victory!

A Report on the Prospects for Postwar Employment In The Industries Served by

Chesapeake & Ohio Lines

Cleveland

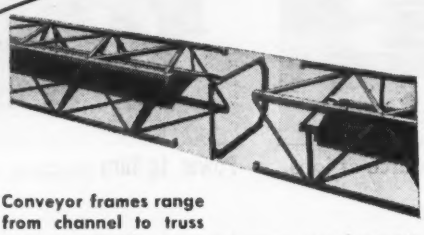
CHESAPEAKE AND OHIO RAILWAY
NICKEL PLATE ROAD
PERE MARQUETTE RAILWAY

How 4-WAY B G Engineering

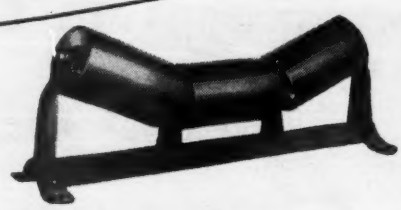
PROVIDES THE PROPER COMBINATION FOR PEAK CONVEYING EFFICIENCY

Terminals are factory assembled as units, ready for bolting to conveyor frame. Field assembly of miscellaneous pulleys, bearings, and other parts, is completely eliminated. Barber-Greene terminals are available in a wide range of types, sizes, and horsepower.

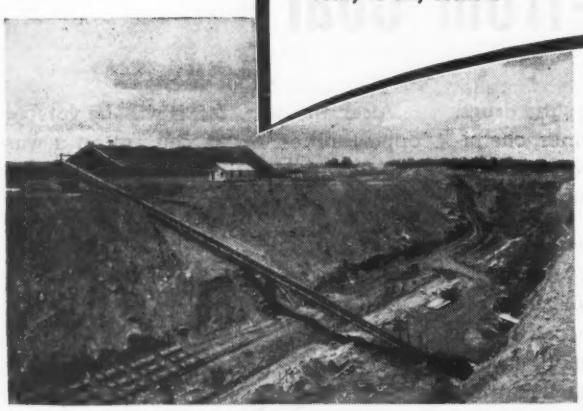
This take-up unit, for instance, is standardized in the same manner as the head-end drive. B-G *pre-engineered* equipment is used in some of the longest conveying systems in the world — for processing, storing, reclaiming, and underground haulage.



Conveyor frames range from channel to truss type, in depths to meet span requirements. Lengthening a conveyor is merely a matter of adding *standardized* sections. Conveyor system is easily revamped — terminal units attach directly to any section.



Carriers and return rollers are properly designed to furnish maximum strength with minimum weight. All steel, jig-welded construction insures correct alignment. Choice of troughing, flat, self-aligning, or rubber impact carriers—with roller, ball or plain bearings.



1. **PRE-ENGINEERING** by Barber-Greene assures selection of the right equipment for your particular job.

2. **PRE-FABRICATION** of conveyor units saves erection time — guarantees correct assembly and belt alignment.

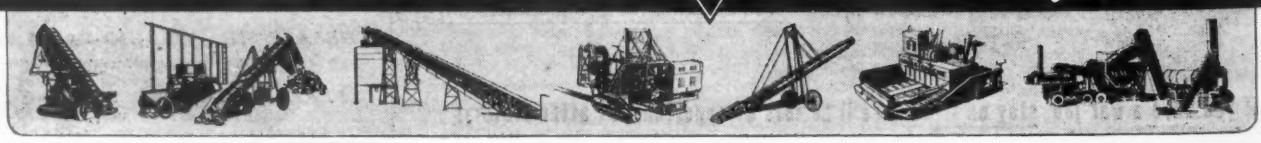
3. **STANDARDIZATION** permits interchangeability — makes installation, alterations and moving speedier.

4. **VARIETY OF EQUIPMENT** gives you the choice of sizes and types that best meet your requirements.

When you have a material handling problem, call in B-G engineers to help you. Barber-Greene Company, Aurora, Illinois.

45-81

Barber-Greene B G *Constant Flow Equipment*



A FEW OUNCES OF PREVENTION
. . . help keep a market for your coal worth millions of tons!

If all new homes were to be built with small chimney flues and with basement facilities suitable only for other fuels, the Bituminous Coal Industry would soon be locked out of one of its major markets. That's why the Bituminous Coal Institute is warning new-home planners to make sure that they do not build the advantages of coal out of their houses.

These "warnings," which appear in Better Homes and Gardens, American Home, American Builder, Architectural Forum, American Press, and the Chicago Journal of Commerce, are only part of the Bituminous Coal Institute's campaign to win new friends and build bigger markets for the industry. Other dramatic and informative advertising and publicity campaigns directed to the general public and to industrial users of coal emphasize the merits of coal as a fuel and the importance of coal and coal by-products to the American standard of living.

This public relations campaign of the Bituminous Coal Institute is part of the unified program for progress within the Bituminous Coal Industry—a program sponsored by mine operators and designed to assure the future of every member of the industry. If you are not yet contributing to this effort, write us at the address below for additional information.

BITUMINOUS COAL INSTITUTE

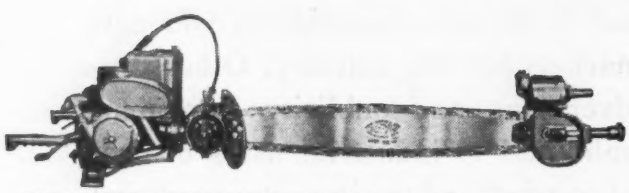
60 EAST 42ND STREET, NEW YORK 17, N. Y.

THEY CAN DO SEVERAL TIMES AS MUCH WORK AS CROSS-CUT SAWS

ESTABLISHED 1840

REG. U.S. PAT. OFF.

DISSTON CHAIN SAWS



DISSTON CHAIN SAW *with Mercury Gasoline Engine*
Model G-26—6 H.P., 24" capacity. Model G-36—6 H.P., 36" capacity
Model G-46—6 H.P., 48" capacity.

DISSTON CHAIN SAW—*Pneumatic*
Model P-27—3½ H.P., 90 cu. ft. at 90 lbs. pressure, 24" capacity.

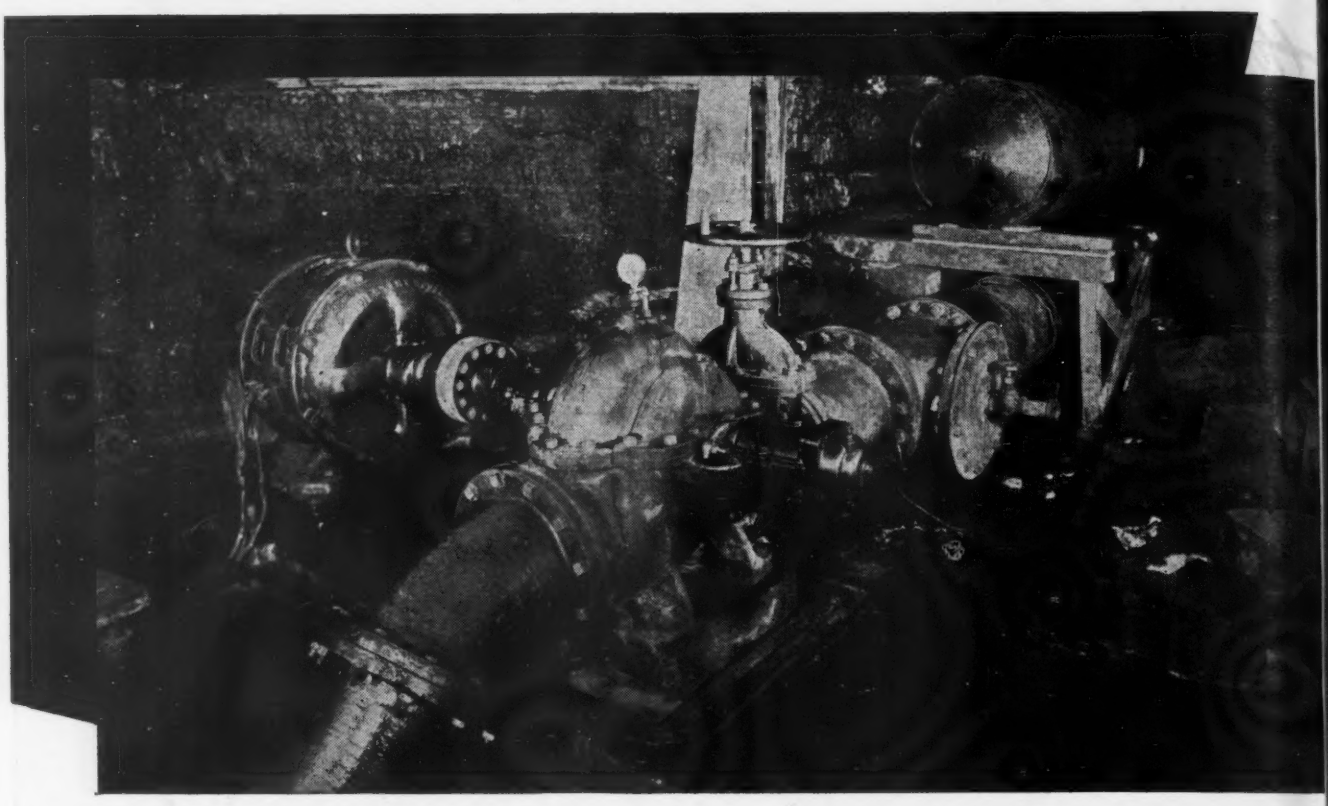
This is one of the fastest and most efficient cutting tools that Disston ever made. On maintenance work in and about the mine; on new construction; for cutting props, beams and other timbers, Disston Chain Saws are speeding up work, reducing costs, and enabling workers to do several times the amount of cutting that can be done with cross-cut saws.

The high quality of Disston Chain Saws has been fully tested and proved on numerous operations in the timberlands, at the battle fronts and by mines of every size. Their simple design and sturdy construction assure long life. Their light weight makes them as portable as any other tools. Operation is easy and can be learned quickly.

There are two types of Disston Chain Saws—with Mercury Gasoline Engine, and with pneumatic drive. Each is designed for both horizontal and vertical cutting, and can be used successfully on woods of every kind.

Disston Chain Saws are *available now*. Write for full particulars.

HENRY DISSTON & SONS, INC., 842 Tacony, Philadelphia 35, Pa., U. S. A.



This Warren Pump in Coal Mine Cuts Pumping Costs Each Month

Wooden hand pump used to drain Gallitzin area mine, one hundred years ago.

A bituminous mine in the Gallitzin area of central Pennsylvania found its old power pumps inadequate to handle drainage. Warren engineers were called in. They recommended the all-bronze, chrome-fitted centrifugal pump shown above.

Capacity; 3500 gallons per minute; 12" suction, 10" discharge openings. In dry seasons, need be operated for only 7 to 10 hours a week. It saves mine owners many dollars in pumping costs each month.

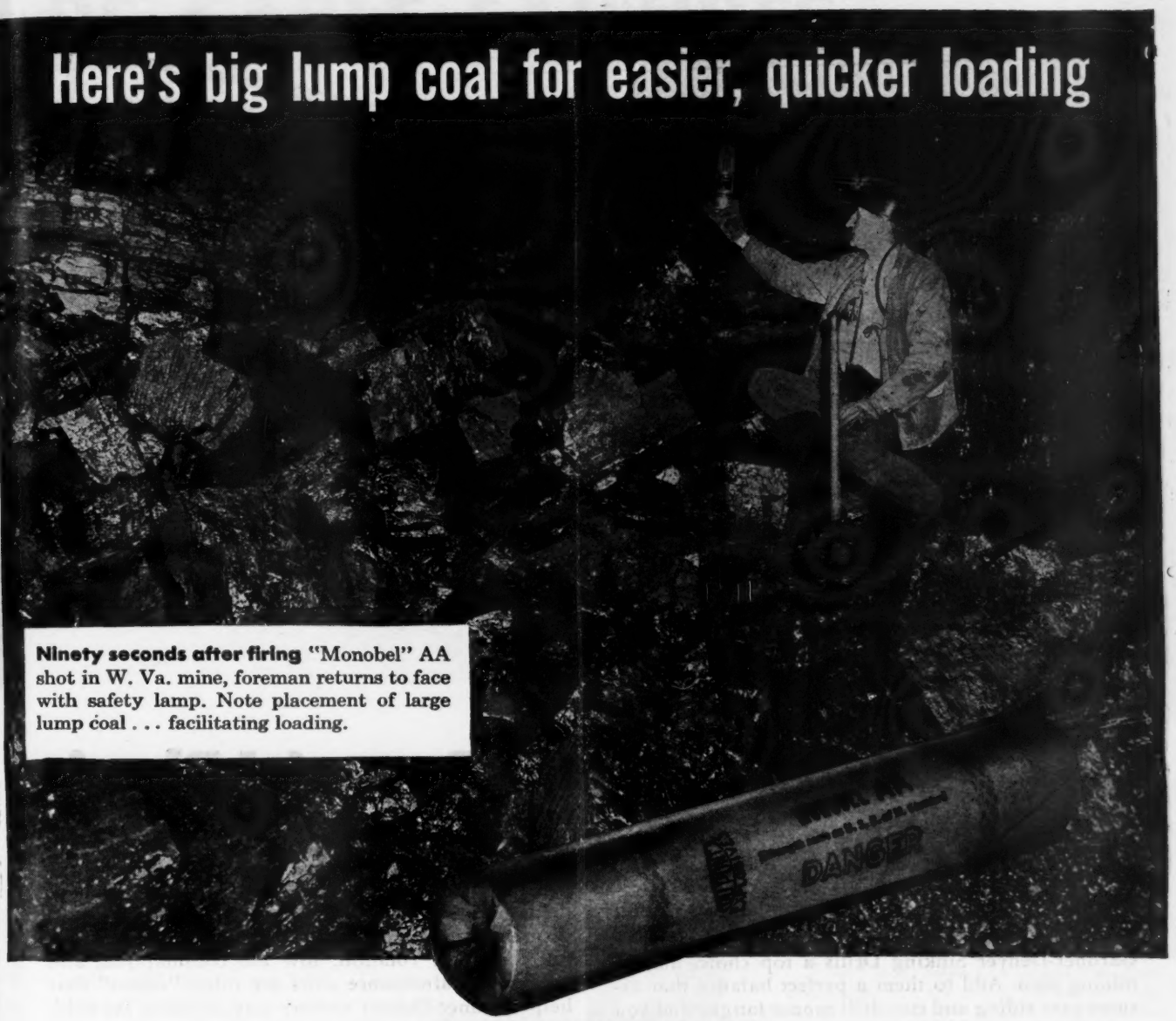
For complete specifications and ratings on this and other Warren Pumps, send for Bulletin 227-1.

ARMY E NAVY

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

Here's big lump coal for easier, quicker loading



Ninety seconds after firing "Monobel" AA shot in W. Va. mine, foreman returns to face with safety lamp. Note placement of large lump coal . . . facilitating loading.

"MONOBEL" AA

helps get more coal out faster...in wet or dry places

Large lump coal like that in the picture above is typical of what you get with "Monobel" AA . . . a new permissible.

Du Pont research developed and perfected "Monobel" AA. It is ideal for hard-shooting coal whether the work is wet or dry, because it provides a combination of coal-getting ability and water resistance.

"Monobel" AA is unique. It piles the coal near the face where mechanical loaders can readily get at it. It doesn't shatter the coal. Face and ribs are sheared clean and square. Frequently, fewer holes are needed.

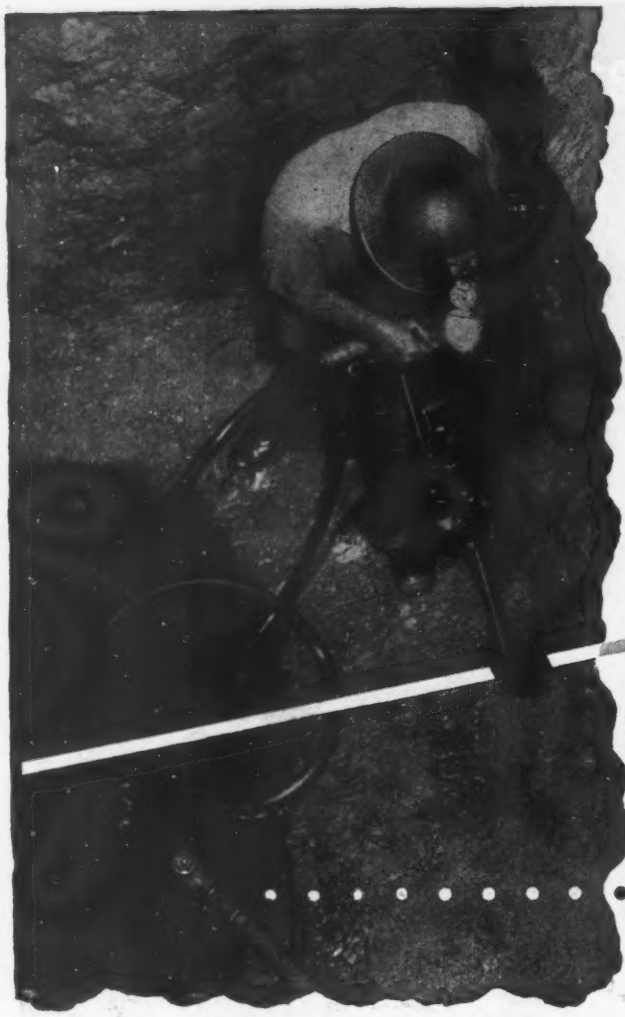
Field reports from many mines show that "Monobel" AA is a powder that meets every condition encountered. It can handle average rock and slate; and in some cases, it is fired after being under water during the entire shift. Fumes are Class A . . . permitting the loading crew to return to the working place with minimum delay.

Introduced little more than a year ago, "Monobel" AA has enjoyed a steady increase in sales. Today, it is a "best selling" permissible.

E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT
PERMISSIBLES
BLASTING SUPPLIES AND ACCESSORIES

DU PONT
REG. U. S. PAT. OFF.



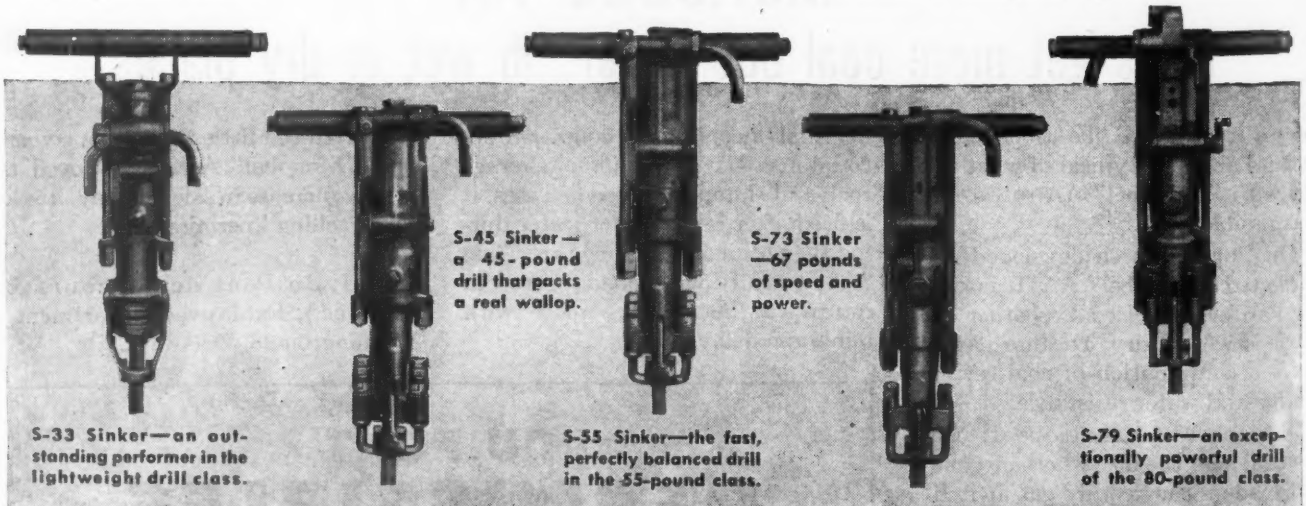
A POWERFUL BLOW...

. . . . . plus Powerful Blowing

• Amazing hole-cleaning ability . . . fast, powerful blows . . . these are two of the features that make Gardner-Denver Sinking Drills a top choice among mining men. Add to them a perfect balance that assures easy riding and cuts drill runner fatigue and you can see why this drill is so popular with drill runners and operators alike.

Gardner-Denver sinkers help speed drilling even in the hardest rock formations . . . permit faster footage per shift. Their exceptional hole-cleaning ability keeps the hole free of all cuttings . . . eliminates stalling . . . assures positive maintenance of drilling speed. Powerful, four-pawl rotation, low air consumption, and minimum maintenance costs are other "extras" that help Gardner-Denver sinkers stay ahead of the field.

For complete information, write for illustrated bulletins. Gardner-Denver Company, Quincy, Illinois.



S-33 Sinker—an outstanding performer in the lightweight drill class.

S-45 Sinker—a 45-pound drill that packs a real wallop.

S-55 Sinker—the fast, perfectly balanced drill in the 55-pound class.

S-73 Sinker—67 pounds of speed and power.

S-79 Sinker—an exceptionally powerful drill of the 80-pound class.

Since 1859

GARDNER-DENVER

ARE CABLE-FAILURES
GIVING YOU A BLACK EYE?

Rewire with ROCKBESTOS A.V.C. *for failure-free performance*

Have your cutters, loaders and locomotives been missing in action too often because their internal wiring couldn't take the insulation-baking overloads of war-time schedules? Have *wire-fires* sent them back to the shops for time-taking overhauls? Have oil and grease done their share of cable destruction?

Then rewire with Rockbestos A.V.C. This *time-tested* cable has kept mining machines working for more than 16 years under the most severe operating conditions. Its tough impregnated felted asbestos insulation and rugged impregnated asbestos yarn braid takes the heat of resistor grids and conductor-heating overloads without baking brittle, cracking, or flowing. It won't rot, bloom or swell even if smeared with oil and grease. And it won't burn or carry flame.

Keep your equipment up at the face and out of the shops with the original Rockbestos A.V.C. Mining Cable . . . standard of leading equipment manufacturers and mine electricians who keep their machines *on the job.* Use it for motor leads, coil connections, and connections between controllers and resistors. For samples and information write to:

ROCKBESTOS PRODUCTS CORPORATION
P. O. Box 1102, New Haven 4, Conn.

THE ORIGINAL ROCKBESTOS A.V.C. CONSTRUCTION

1 Heatproof, fireproof, rugged impregnated asbestos yarn braid resistant to moisture, oil, grease, and alkalies and diametered to fit bushings properly.

2 Felted asbestos insulation, impregnated with heat, flame and moisture resistant compounds like the braid, will not dry out, bake brittle, crack, flow or burn—a real barrier against the destruction caused by heat and travelling wire-fires.

3 Lubricated varnished cambric for high dielectric strength and added moisture resistance—protected from heat, flame and oxidation by two felted asbestos walls.

4 Inner felted asbestos insulating wall, also impregnated with heat, flame and moisture resisting compounds, withstands conductor-heating overloads and won't bake brittle or burn.

5 Paper separator to make stripping easy and prevent the insulation from sticking to the conductor.

6 Flexible tinned copper conductor, perfectly and permanently centered in helically applied non-flowing insulation.

This construction is one of 125 developed for severe or unusual operating conditions by Rockbestos.

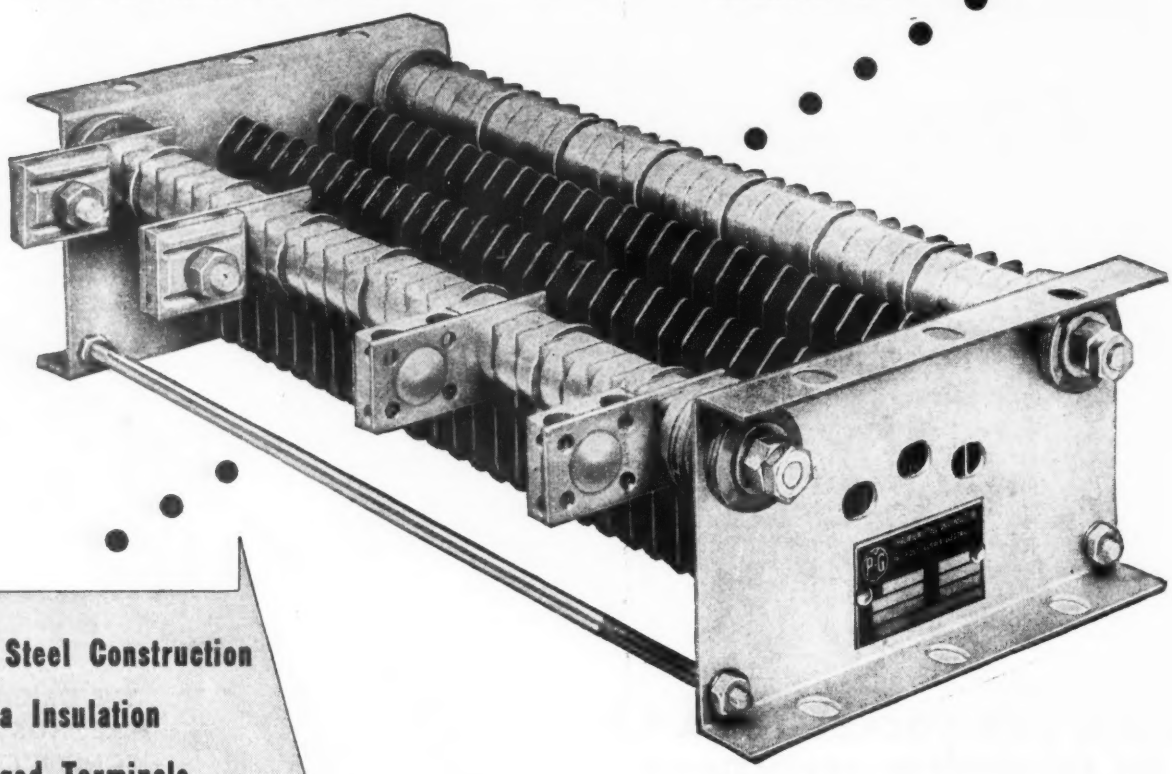
ROCKBESTOS A.V.C. ***The Cable with Permanent Insulation***

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec. & Mfg. Co.	PITTSBURGH, PA.:	Upson-Walton Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.		Westinghouse Elec. Supply Co.
BLUEFIELD, W. VA.:	Superior-Sterling Co.	HUNTINGTON, W. VA.:	Banks-Miller Supply Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
CHARLESTON, W.VA.:	Charleston Elec. Supply Co.	LOTHAIR, KY.:	Mine Service Co.	WHEELING, W. VA.:	Westinghouse Elec. Supply Co.
CLEVELAND, OHIO:	Upson-Walton Co.	MIDDLEBORO, KY.:	Rogan & Rogan Co.	WILLIAMSON, W.VA.:	Williamson Supply Co.

FOR VICTORY—GET OUT COAL and INVEST IN U. S. WAR BONDS

Built...FOR SEVERE SERVICE



- ☆ All Steel Construction
- ☆ Mica Insulation
- ☆ Rugged Terminals
- ☆ Provision for Expansion
- ☆ Adequate Ventilation
- ☆ Unaffected by Vibration
- ☆ Moisture Resistant
- ☆ Corrosion Protected

Steel Grid Resistors
for COAL MINES
Since 1915

P-G *for* Heavy Duty Applications . . .

By use of those durable raw materials . . . steel and mica, and the P-G exclusive features of design, these Steel Grid Resistors have the extra stamina to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little material effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous *Trouble-Free* performance is assured.

P-G

The Nonfreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

Many problems . . .
Four solutions

In every coal mine the operations of screening, sizing, separating and dewatering pose a number of problems . . . problems at times unique to that particular installation.

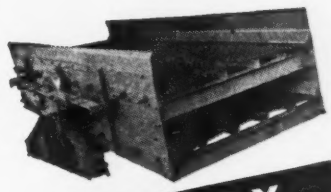
The superintendent knows what he must accomplish to insure having coal or ore in the capacities and sizes he requires. But—and this is understandable—he may not know precisely what type or types of Screens he needs to get what he wants.

That is where Robins comes in. First of all, each Robins Sales Engineer is an engineer—trained and experienced in understanding objectives and knowing how they can be attained. Next, he has at his disposal four distinct types of Vibrating Screens, each available in a number of styles designed to serve some specific portion of your overall screening demands. In addition, he has a wide selection of Robins Screen Cloth—in meshes and weaves adequate for every purpose.

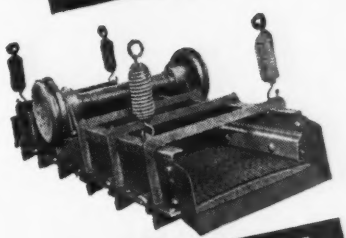
From all of this, Robins is able to supply practically any mine—large or small—with the exact answers to all its screening problems, be they simple or complex.

In turning to Robins for your Vibrating Screens, you are dealing with the company which originated many of the basic ideas employed in modern-day Screen design. (The circle-throw principle, for example, was conceived by Robins.) So you can be certain of recommendations backed by authority and founded on experience.

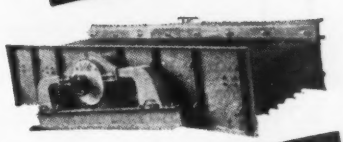
Perhaps you face a problem now—or know what you want and intend to fill that want with Screens that will give dependable service for a long time. If so, get in touch with Robins. When writing, please address Dept. CA-8.



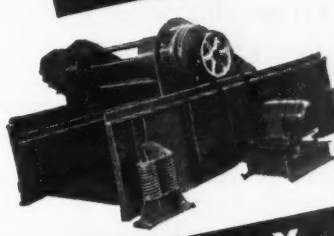
GYREX



VIBREX J



VIBREX M



ELIPTEX

ENGINEERS, MANUFACTURERS AND ERECTORS OF MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS · COAL AND ORE BRIDGES · BUCKET ELEVATORS · CAR AND BARGE HAULS · CAR DUMPERS · CAR RETARDERS · CASTINGS · CHUTES · CONVEYOR IDLERS AND PULLEYS · CRUSHERS · FEEDERS · FOUNDRY SHAKEOUTS · GATES · GEARS · GRAB BUCKETS · PIVOTED BUCKET CONVEYORS · VIBRATING SCREENS · SCREEN CLOTH · SELF-UNLOADING BOAT MECHANISMS · SKIP HOISTS · STORAGE AND RECLAIMING MACHINES AND SYSTEMS · TAKEUPS · LOADING AND UNLOADING TOWERS · TRIPPERS · WEIGH LARRIES · WINCHES · WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's **ROBINS**

ROBINS
CONVEYORS
INCORPORATED
Founded in 1895 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

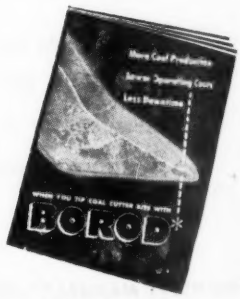
Here's "DIAMOND-LIKE HARDNESS" for coal cutter bits

BOROD increases bit life up to 8 times on regular or throw-away types

TO WITHSTAND the intense wear of cutting coal and to *retain sharpness* of points, apply BOROD to tips of all coal cutter bits. It's surprising how little BOROD is required to obtain maximum increase in bit life—in fact *one pound* of BOROD brings this wear protection to as many as *4000 bits!*

With easily made jigs a good welder can hard-face an average of *450 bits per hour* with oxy-acetylene equipment, hard-facing costs total only a fraction of a cent per bit. BOROD keeps bits on the machine during an entire shift, saves down-time for bit changes and cuts several times more kerf than heat-treated bits. Used by mine operators in all parts of the United States.

WHY NOT TRY 5 LBS. OF BOROD TODAY?
Costs only $5.50 per lb. in 1/8" x 14" rod sizes, f.o.b. distributors' warehouse or Whittier, California. Available from over 600 U.S. distributors.



This Free Folder Gives Complete Borod Story.
Shows correct oxy-acetylene flame adjustment for application, welding jigs and economy advantages. Write for your free copy today!

Stoody Company, 1143 West Slauson Avenue, Whittier, California

STOODY HARDFACING PROLONGS LIFE OF ALL WEARING PARTS

Over 25 commonly used pieces of coal mining equipment can be hard-faced with Stoody Alloys and made to last from two to ten times longer. Write for information on how to prolong life of your conveyors, crushers, cutter chain lugs and straps, loaders, dipper parts, etc.

STOODY HARD-FACING ALLOYS
Retard Wear  **Save Repair**

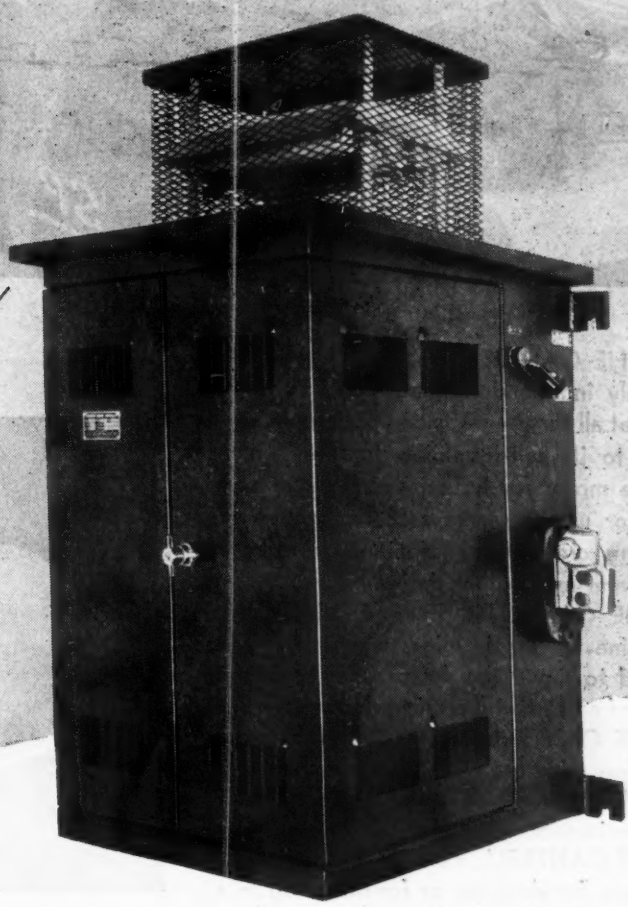
ELIMINATE

the chief causes of

MINE FIRES

and

EXPLOSIONS



INSTALL

I-T-E SECTIONALIZING CIRCUIT BREAKERS

● Electrical disturbances on underground distribution systems need not be the chief cause of mine disasters. When I-T-E Sectionalizing Circuit Breakers stand guard, dangerous currents are interrupted before damage occurs. Unlike many safety devices, these circuit breakers improve operating conditions and increase production.

Sectionalizing units are used on transportation trolley and feeder circuits, as either independent feeder circuit breakers or as tie feeder circuit breakers. They open automatically when current exceeds a predetermined value and remain open from 1 to 45 seconds, as adjusted, reclosing only when line conditions are again safe.

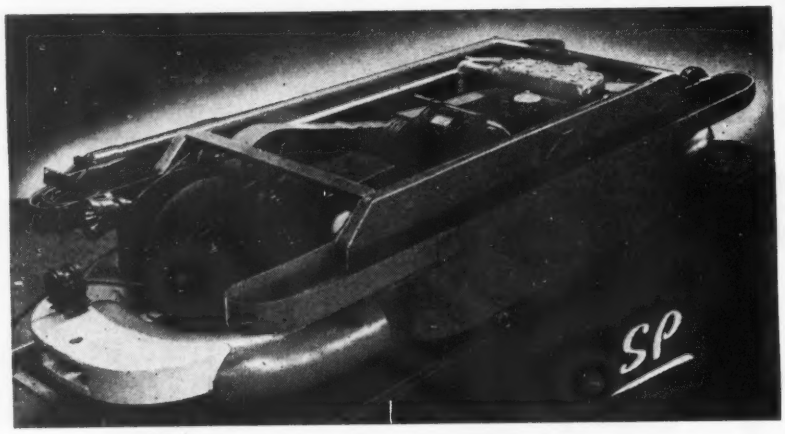
Operating on circuits which may be fed from either direction, I-T-E Sectionalizing Circuit Breakers are highly sensitive to disturbances on either side of them and separate the substations quickly when overloads occur. Impaired sections are prevented from being fed from a distant substation. You can depend on the KSC to "know" of disturbances which would never register on a distant substation circuit breaker.

Substantial savings, which more than pay for the equipment, are realized by I-T-E Sectionalizing Circuit Breakers. Only the section affected is shut down when trouble occurs and the rest of the mine continues to produce. Repair and maintenance of electrical equipment is greatly reduced as damaging overloads are eliminated. Get the full story, write today for Bulletin 2502 or call an I-T-E representative near you who has complete data on many varied installations. The I-T-E Circuit Breaker Co., 19th & Hamilton Streets, Philadelphia 30, Pa.

Representatives in Principal Mining Areas.

I-T-E AIR SWITCHGEAR

★ WE'VE BUILT EVERY COAL MINE REQUIREMENT INTO THESE FOUR CANTRELL COMPRESSORS



★ CANTRELL Compressors were "born and bred" in the coal fields. Each one designed and constructed to meet coal mining conditions . . . each one built to do its job the way coal mining men want the job done. These facts and good engineering, for this specialized field, are directly responsible for the popularity of these fine machines.

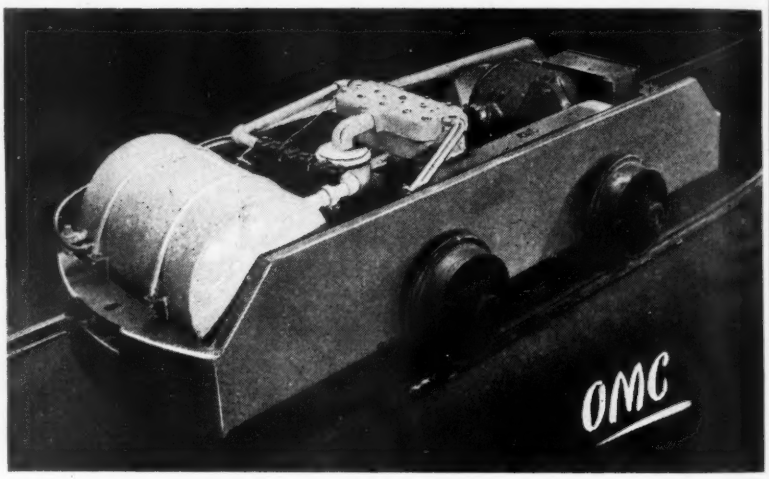
All Cantrell Compressors are, first, simple in design and easy to operate. No fancy frills or "gadget" trouble makers are used on a Cantrell. Second, Cantrell Compressors are built rugged to stand up under hard service. Third, they are sold at a price that most mines find it pays to have two or more on hand to take full advantage of their savings in time and money.

★ THE CANTRELL, TYPE SP, is a completely independent machine. It's on its own at all times—waits on nothing. In addition to its self-tramming feature, with a single motor for both tramming and compressor use, it serves as a locomotive for hauling crew and equipment, transfer of cars, and many other duties.

THE CANTRELL, TYPE O. M. C., is a machine for use in mines where it is preferred to move the compressor in regular trips of cars or with an extra locomotive.

THE CANTRELL, TYPE C-1 is built for trackless mine use or for shop use where a portable compressor is preferred to stationary equipment.

THE CANTRELL, TYPE SL is our stationary type for shop use or for mounting in a mine car for transfer from place to place for service.



★ With any Cantrell Compressor, you get the advantage of our "compressor exchange plan". A plan whereby worn compressors are exchanged, at low cost, for complete factory rebuilt units.

Write now for complete information.

Cantrell COMPRESSORS

IMPERIAL-CANTRELL MFG. CO., JELLICO, TENN.

WEMCO'S

Research
Planning
Engineering
Field Work
Manufacturing

Total: *Greater Production* from

WEMCO HMS EQUIPMENT

The superior production delivered by Wemco equipment is a benefit accruing from Western Machinery Company's long-time study of HMS processes. Continued solving of machinery problems as they arise has given Western Machinery Company a fund of knowledge from which it draws to keep pace with developments in HMS.

Because of the know-how gained in implementing *more* HMS plants than any other manufacturer, Western Machinery Company leads in development of machinery specifically for Heavy Media Separation.

Improvisation plays no part in any of Western Machinery Company's installations. When you take advantage of the economy made possible by HMS in coal preparation, Western Machinery Company is fully prepared to offer equipment tailored to the needs of your job.

WEMCO

WESTERN MACHINERY COMPANY

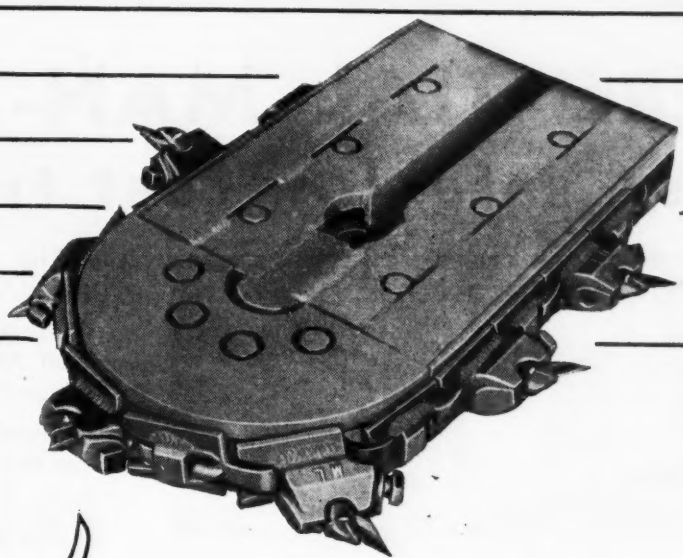
760 FOLSOM STREET, SAN FRANCISCO 7, CALIFORNIA

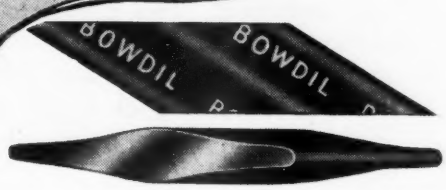
LOS ANGELES • SACRAMENTO • SPOKANE • SALT LAKE CITY • PHOENIX • DENVER • NEW YORK • WASHINGTON, D.C.

AGITATORS • SAND AND DIAPHRAGM PUMPS • FEEDERS • CLASSIFIERS
HYDROSEPARATORS • THICKENERS • TABLES • H M S EQUIPMENT

1015

What single fact makes BOWDIL your best choice for coal cutting?





Here's a close-up to show the concave design of BOWDIL Bits and the rugged construction of BOWDIL chain sections.

WORKMANSHIP . . . that's the answer! It's apparent in every detail of construction in every BOWDIL tool. And it's even more apparent in the *results* wherever BOWDIL equipment is used.

Let's take for an example the BOWDIL Combination—Bar, Bits and Chain. The Bar, thin, compact for easy handling, features a Z-form design to insure maximum rigidity. The Bits are made with concave faces to cut thinner kerf and less dust. This shape permits wearing the bits down 25% farther than with standard types. BOWDIL Chain sections are drop-forged. Connections, which are easily demounted, are large and can't come apart — nor can the Chain kink in use!

This is only a brief summary, but you can see that BOWDIL tools carry a lot of important advantages. If you'd like further details we'll be glad to furnish them.

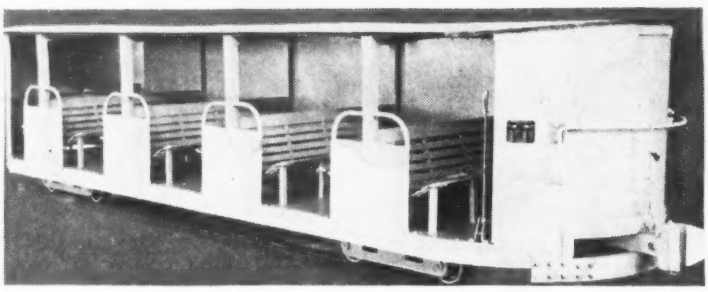
"Headquarters for Coal Cutting Equipment"

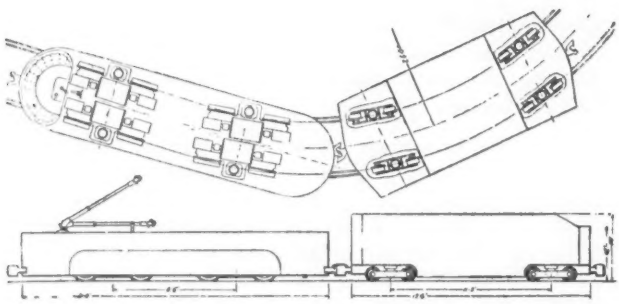
BOWDIL

Canton, Ohio

DIFFERENTIAL MAN-TRIP CARS

for fast, safe, low cost transporation





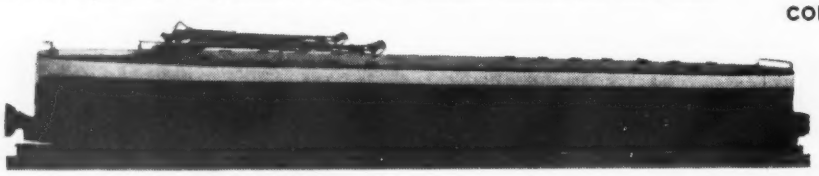
Differential 360 horsepower 8-Wheel AXLESS Locomotives and 10-ton 8-Wheel AXLESS Mine Cars increase mining capacity, and reduce mining costs. Provide more adhesion for tractive effort and braking . . . pull longer trains at higher speeds with greater safety . . . haul greater loads with less punishment to track . . . use less electric current per ton hauled

● This sturdy Man-trip car with Differential 8-Wheel AXLESS Trucks meets the need for safe, rapid transportation of men to and from working places underground.

It provides a comfortable, clean, dry ride for the men. The car is 22 feet long—seats 38 men—can negotiate a 30 foot radius curve.

Steel construction is used throughout with wood top over the metal roof as a protection in event trolley wire is encountered. Both ends and trolley wire side are fully enclosed. This prevents men from getting out on the wire side and avoids costly accidents. This also protects men from roof falls, rock dust, water, and shields them from cold intake air in winter.

These Man-trip Cars with Differential AXLESS 8-Wheel Trucks provide faster transportation with safety, getting the men to the working place quicker—and in comfort.

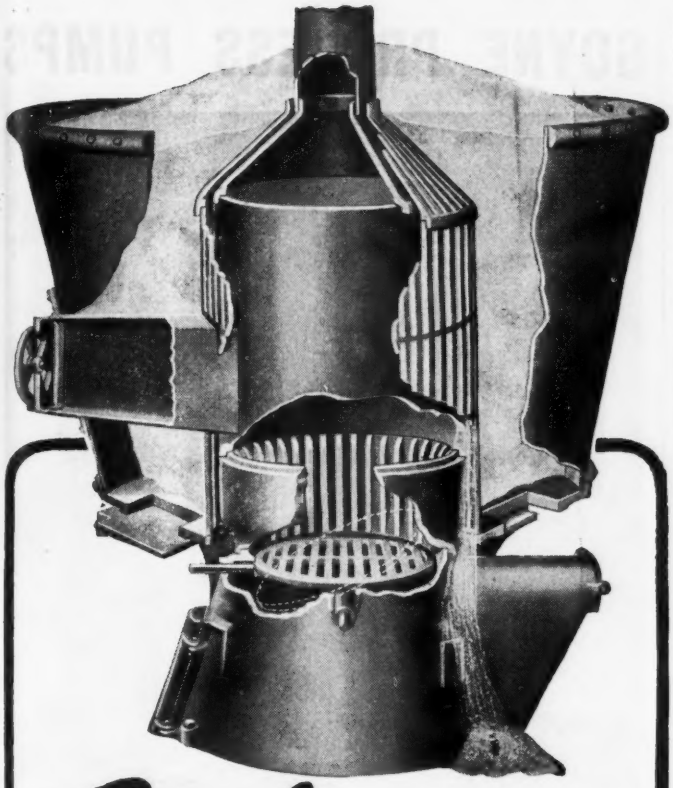


DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS



Viloco

AUTOMATIC SAND DRYER

Reduces Fuel Costs for Drying Sand

The operation of the Viloco Sand Dryer is automatic—sand flows freely through the grating as it dries. The grating is so constructed that it prevents wet sand coming in contact with the stove. Plenty of cleaning slides are provided around the hopper base for ready removal of any material that cannot pass through the grating. The fire grate can be removed through the ash door. Parts of stove subjected to fire are made of Chrome Nickel Heat Resisting Iron.

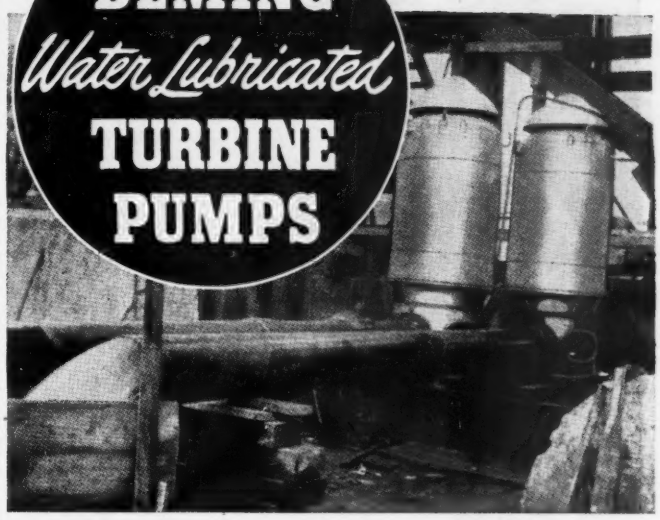
The Viloco Sand Dryers are made in two sizes. The hopper capacity of the No. 1 featured above is 3 cubic yards and a smaller size, No. 2, with 1 cubic yard capacity.

The hopper should empty itself about once every two hours under ordinary conditions.

VILOCO RAILWAY EQUIPMENT CO.

332 SOUTH MICHIGAN AVENUE · CHICAGO

DEMING *Water Lubricated* TURBINE PUMPS



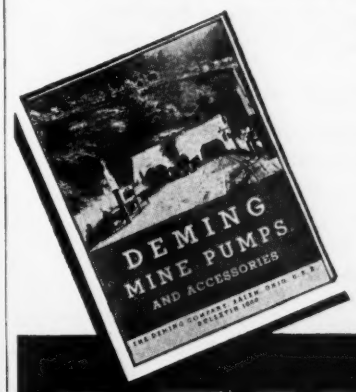
Low Cost Mine Drainage!

Installed on the surface and operating through boreholes, Deming Deep Well Turbine Pumps provide low cost dewatering of inaccessible sumps, closed-off sections and any other locations where it is either too costly or impossible to use any other dewatering methods.

Among the many advantages of Deming Turbine Pumps are easy installation; positive lubrication without oil or grease (Goodrich cutless rubber bearings are flooded continuously with water being pumped); multi-stage vertical construction which permits pumping from any depth below the surface; low cost power; and a minimum of maintenance.

If you have a dewatering problem, investigate Deming Water Lubricated Turbine Pumps.

THE DEMING COMPANY • SALEM, OHIO



Write for Bulletin 1000 which illustrates and describes the advantages of Deming Turbine Pumps and other types of Deming Mine Pumps which have proved highly successful for dewatering service.

DEMING
Mine Pumps

Carry your part of the load

Separate and tie in bundles: 1. Wastebasket scraps. 2. Corrugated boxes, brown paper and bags. 3. Magazines and books. 4. Newspapers.

send every scrap of WASTE PAPER TO WAR

V-E DAY did not ease the waste paper shortage. Paper is *still* urgently required for the millions of tons of supplies being used against Japan as well as for essential home front needs. Double and even triple wrapping is needed to guard against the hazards of the long sea trip and such conditions as jungle dampness, dry rot, and insects.

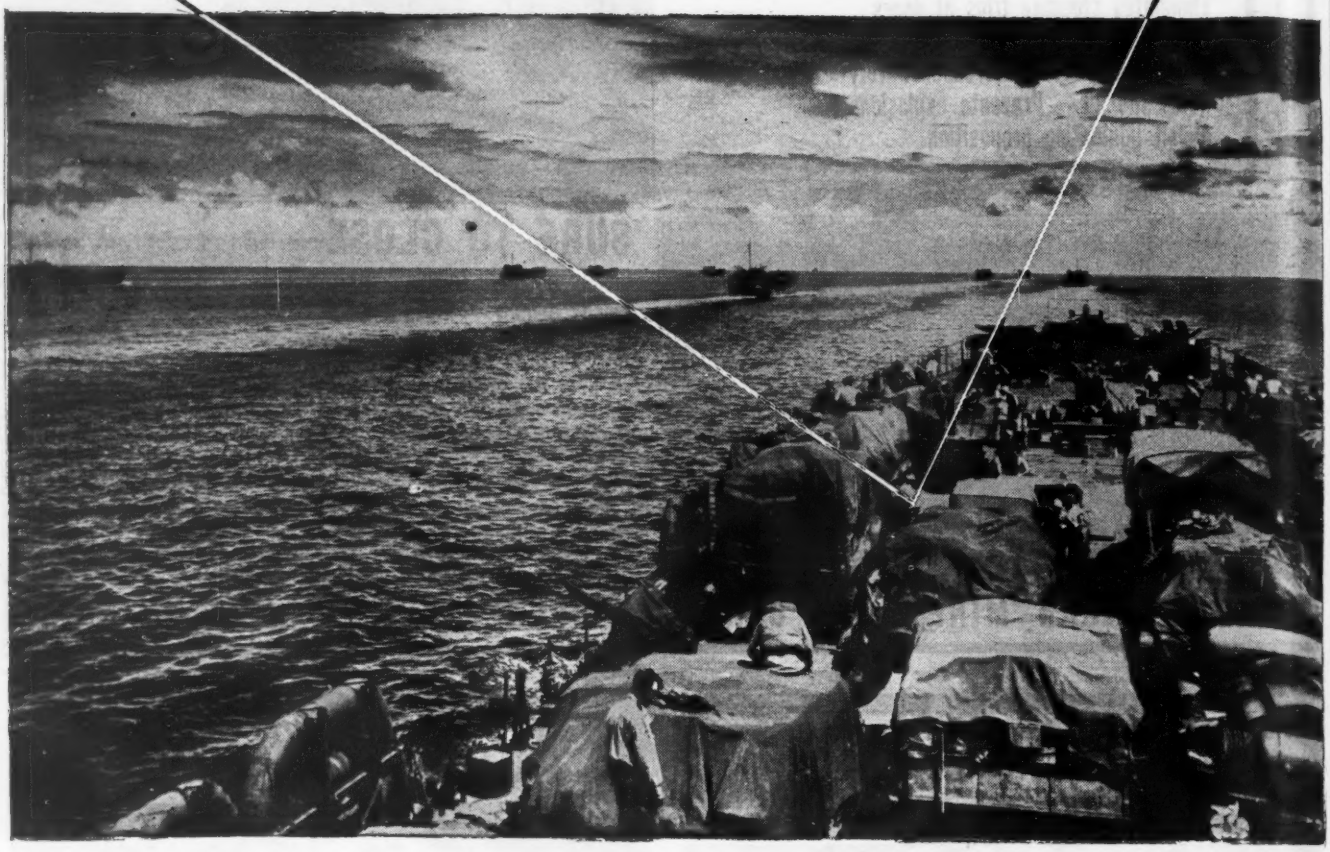
That's why waste paper is still a No. 1 war material shortage. All old paper not actually useful in your business is needed *now*. Dig out those old files and records!

A good way to get waste paper collected is to *appoint a Salvage Chief* in your office. Let that person take charge of getting all your old paper bundled and turned in. Then . . . if it isn't collected regularly, he should call your local Salvage Committee.

And remember, the only way to help avoid further drastic cuts in civilian paper allotments is for *everyone* to save waste paper.

This advertisement prepared by the War Advertising Council in cooperation with the War Production Board and the Office of War Information. Space contributed to the Waste Paper Program by this publication.

On their Way again to Win again!



Are You?

Today the veterans of our European victories are sailing to final triumph in the Pacific! Meanwhile patriotic American industrial leaders are following a full-speed-ahead program to hasten peace through the Payroll Savings Plan!

From coast to coast, veteran Bond salesmen—and women—who put over the Mighty 7th, are once more mustered into service for plantwide selective resolicitation campaigns. These special efforts to keep employee Bond buying at a maximum are directed toward two major objectives:

A To hold every new 7th War Loan subscriber on the Payroll Savings Plan books—maintaining and, wherever possible, increasing present Bond allotments.

B To convince all regular subscribers who recently stepped up their Bond buying, of the many advantages of continuing on this foresighted, extra-Bonds-for-the-future basis.

Back up our fighting men who have won one war—and will win another. Use selective resolicitation to make your Payroll Savings Plan more effective—put a tighter rein on inflationary tendencies—build peacetime prosperity.

The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

★ *This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and War Advertising Council* ★

POSITIONS VACANT

WANTED ENGINEER—Draftsman experienced in structural, mechanical, and material handling layout, design and construction for coal mines. Practical knowledge of tipples and washeries desirable. Permanent position with operating company, location Northern West Virginia. Give age, education, experience, salary expected, when available, other details in first letter. P-317, Coal Age, 330 West 42nd St., New York 18, N. Y.

WANTED: EXPERIENCED, capable, reliable engineer, for a growing, reliable stripping coal corporation. Permanent position. Give experience, reference and salary expected. Write P-318, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED: MASTER mechanic for reliable growing coal stripping corporation. Must know large stripping equipment. Give full details as to experience, reference and salary expected. Write P-319, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

(Additional Positions Vacant ads on opposite page)

BUSINESS OPPORTUNITIES

FOR SALE or Lease: A going coal mine with an 18 car railroad siding 90 feet from drift mouth, finest quality coal, cutting machine, 2 electric coal drills, fan, hoist, pump, mine cars, tipple, out buildings, and misc. tools. Must sell or lease to highest bidder; partners can't agree. For details write the Mozide Coal Company, Whitesburg, Ky.

COMPANY WITH loaders and other mining equipment for high coal please contact inactive mine owner for attractive proposition to operate property. Describe equipment. BO-320, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE: 4,000 acres coal land in fee. Valuable timber. 3 or 4 good seams, lower dean, pewee, etc. $12.50 per acre. R. T. McNees, Hotel Norton, Norton, Virginia.

WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT : "OPPORTUNITIES" : EQUIPMENT
BUSINESS : : USED OR RESALE

UNDISPLAYED —RATES— DISPLAYED

10 CENTS A WORD, MINIMUM CHARGE $2.00.
Positions Wanted (full or part time salaried employment only) ½ the above rates payable in advance.
Box Numbers—Care of publication New York, Chicago or San Francisco offices count as 10 words.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.

The advertising rate is $6.30 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received by August 31 will appear in the September issue, subject to limitations of space available.

Additional
Employment Ads.
on Opposite Page

COAL MINING SAFETY ENGINEER

Unusual opportunity for man with experience in Coal Mining, including accident prevention, to affiliate with the National Safety Council. Should have college degree as mining engineer or equivalent, and be able to write technical pamphlets—know thoroughly every phase of safety in Coal Mining and be able to work with committees in the development of technical materials and accident prevention programs for the Mining Industry. Salary open. Council has pension, vacation and insurance plan.

Write Personnel Dept.

National Safety Council

20 N. Wacker Chicago 6, Ill.

Giving full details of experience.

READY FOR IMMEDIATE SHIPMENT

4—10-ton Jeffrey Locomotives—(13-ton equipment)
Serial numbers—5203—5758—6220—6221
Motors—2 MH-110, 250 volt B.B.
Axle diameter .....4½"
Inside steel tired wheels....33"
Wheel base .....60"
Height .....38"
Outside armorplate frame
MB-26E Arcmaster Control
(Equipped with gear cases and steel strip resistances)
While these locomotives are now 44" gauge they can be easily changed to 36" or 42" gauge merely by shoving the wheels in on the axles. They have just been taken out of service and are equal to rebuilt locomotives.

1—15-ton Goodman Locomotive—
Serial number 4604
Motors—36-A-O-4-C, 250 volt B.B., 90 H.P. each
Outside armorplate frame..3½"
Height .....38"
Wheel base .....66"
Controller type LM-61
Inside steel tired wheels....33"
Track gauge now 44"—can be easily changed to 36" or 42".
(This locomotive completely rebuilt and guaranteed.)

8—8-ton General Electric Locomotives—
Serial numbers—8406—8407—7534 — 9465 — 9844 — 10381 — 10382—10383
Motors—HM-822, 250 volt B.B.
Controller type R-109
Height overall .....31"
Draw bar pull.....4000#
Wheel base .....46"
Outside armorplate frame.2½"
Steel tired wheels.....30"
(Equipped with CY-21 floating type gathering reels and cable) The armatures are equipped with Mica Glass Insulated Coils—have steel strip resistances and gear cases. Completely rebuilt and guaranteed.

Frank J. Wolfe

We also have several 6 and 8-ton General Electric Locomotives with HM-801, 803, 821 and 823, 250 volt ball bearing motors, all equipped with CY-21 gathering reels and steel strip resistances. 36" to 44" track gauge. Can be easily changed to any gauge suitable for your requirements.

2—200 KW General Electric Motor Generator Sets, 250/275 volt DC, 1200 RPM, 3 phase, 60 cycle, 2300/4000 volt AC, complete with switchboards and all necessary switchgear, including automatic reclosing circuit breaker for the DC end.

2—Very late type Jeffrey L-400 Loading Machines—purchased new in 1942. Excellent operating condition.

Several 3, 4 and 5-track Steel Tipples and Electric Hoists with 200 to 1500 H.P. motors.

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY

306-7 Beasley Building L. D. Phone-34 Terre Haute, Indiana

FOR SALE
Diesel Electric Plant 62.5 KVA

3 Phase, 240-480 Volt, Westinghouse Generator Direct connected to Superior Diesel GA6, with switch board $2,500.00

HOLTKAMP ELECTRIC SERVICE
CENTRALIA ILLINOIS

FOR SALE
ALL OR IN PART

Sand and Gravel Plant, including Jaw Crusher, Gyratory Crusher, Conveyors, Vibrating Screens, Sand Classifiers, Extra Heavy Scrubber, Water Pumps, Sand Pumps, Feed-O-Weights, Weightometers, Trestle and Tripper and Auxiliary Equipment.

ALSO

Approximately 9 miles of Conveyor, complete with belting, pulleys, troughing and return idlers and drive equipment.

All offered subject to prior sale.

For Particulars Write

Columbia Construction Co., Inc.
Box 579, Redding, California
Telephone Redding 1440

WE WANT
DESIGN ENGINEERS AND DRAFTSMEN

Experienced with creation of design and detail assemblies of HEAVY EXCAVATING MACHINERY, POWER SHOVELS, ROCK HANDLING CONVEYORS AND BULK MATERIAL HANDLING EQUIPMENT. Only persons with well founded practical and technical experience should apply. Permanent positions at good salaries and opportunities for advancement in a rapidly expanding organization will be possible to those who qualify. All replies confidential. Address J. F. Joy, Vice President—Engineering, The Federal Machine and Welder Company, Warren, Ohio.

FOR SALE:

1—Deming Pump, Fig. 4032, 4" Suction, 4" Discharge, Chrome Iron, Centrifugal Side Suction Pump with Base, Coupling, Automatic Motor Starter & 20 HP DC Motor.
1—20 Ton Fairbanks Motor Truck Scale, 9' x 24'.
3—New Transformers, 10 KVA ea. 60 Cycle, 1 Phase, Oil filled, Primary V. 4160 Secondary 480/240. Made by Westinghouse.

NEWPORT COAL COMPANY
P. O. Box 111 Uhrichsville, Ohio

FOR SALE

1—G.E. 350 HP Motor. Serial #736,155 Type I, Class 12, 600 RPM Form M, 60 Cycles, 415 Amprs, 2300 Volts, 585 RPM full load, with G.E. Drum Controller, TYPE 108-A V Belt drive.

FRANKLIN COAL MINING CO.
Birmingham, Alabama

WANTED

2—Jeffrey 24 B—Longwall Machines 250 volts D.C.
2—Sullivan CR 2—Shortwall Machines 250 volts D.C.
10—Jeffrey 35 L—Shortwall 220/440 volts A.C.
1—Sullivan Air Compressor Class WL 44, 210 C.F.M.

BERRETTINI ELECTRIC CO.
378 N. Main St., Plains, Pa.

FEEDER WANTED

1—Heavy Duty electric vibrating grizzly type feeder, 2 vibrator units size 5 Jeffrey Traylor, or equal.

THE NATIONAL LIME & STONE CO.
FINDLAY, OHIO

FOR SALE

2—CE-7 Sullivan Shortwall Machines—220 volts D.C.
1—56 kw. M.G. Set—250 volts D.C.—220 volts A.C.
1—2-in. Centrifugal Pump—115-ft. head—220 volt A.C.

Knickerbocker-McSparin Coal Co.
Carrier Mills, Illinois

WANTED

WALKING DRAGLINE

5–10 cu. yd. capacity

B. F. WALLACE
Huntingdon Valley, Pa.

48 & 60 INCH CONVEYOR BELTS

850 Ft. 48 In. 8 Ply.
2175 Ft. 60 In. 10 Ply.
CONDITION LIKE NEW

R. C. STANHOPE, INC.
60 East 42nd St. New York 17, N. Y.

UNIVERSAL TOOLS! NATIONALLY ADVERTISED BRANDS AND PRICES.

If it's Tools—We have it, Can get it, or it isn't made! *Price List & Order Blank Free!!*

UNIVERSAL TOOL COMPANY
O. B. Demattels, President
1527 Grand P. Kansas City, Missouri
Immediate Shipment: Overnight by Air: To Anywhere—USA.

NEW "SEARCHLIGHT" ADVERTISEMENTS

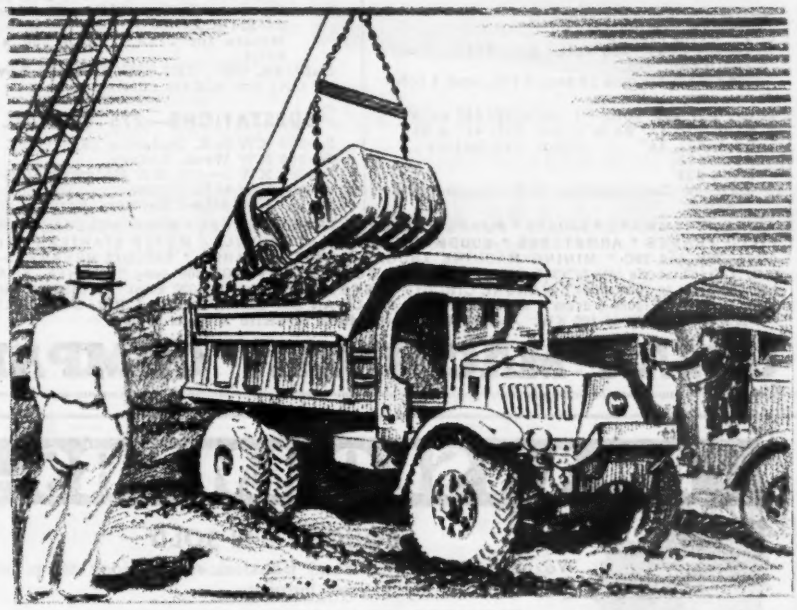
received by August 31st appear in the September issue, subject to space limitations.

Address copy to the Departmental Staff

COAL AGE
330 West 42nd St., New York 18, N. Y.

Strip and Load by Dragline

—A Tip from ECONOMY COMPANY to COAL Strippers



Some pits afford the ECONOMY of stripping and loading by Dragline. Keeps the trucks on high ground and speeds up the haul. Whether you strip and dig with draglines or shovels—or both—ECONOMY COMPANY has a huge listing of equipment of all kinds for strip-pit operation. Including power shovels, diesel, gas and steam, draglines, dragline buckets, motor trucks, wheeled and crawler tractors and trailers—at prices which will attract you.

Write, Wire or Phone your needs.
We will arrange a demonstration.

26 Yard
SHOVEL
DRAGLINE

One 26 yd. Marion electric shovel.
120' boom, 83' dipper stick.
26 yd. dipper.
200' sectional dragline boom.
20 yd. dragline bucket.
Condition good.
Ready for immediate release.

One—3 yd Link-Belt shovel and dragline combination. Ready for immediate shipment.
One—3 yd 3W Monighan—equipped either for electric or diesel operation.
One—5½ yd Monighan dragline. Electric. 115' boom. Excellent condition.

4 YD. DIESEL DRAGLINE
75' Boom. 200 HP Atlas diesel engine.
P&H Model 900

One—2 yd diesel Lorain Model 81. Built in 1939. Shovel and dragline combination. Ready for immediate shipment.
One—2½ yd Sargent Model 12 dragline, 70' boom.
One—2¼ yd P&H 780 dragline—diesel powered—75' boom.

NORTHWEST 80
2½ yd. shovel and dragline.

One—1½ yd diesel Lorain 77 shovel and backhoe combination.
One—1½ yd Lorain 77 gas powered shovel and dragline. Rebuilt and guaranteed.
One—1½ yd Lorain 75B shovel and dragline combination.
One—1½ yd Osgood shovel. Excellent condition.
One—1½ yd Bucyrus-Erie 37B shovel and dragline combination—gas powered.
One—2 yd Bucyrus-Erie 50B diesel dragline.

BARGAIN
1—¾ yd. diesel dragline.
34" wide and 17' long cats.
60' dragline boom.
Atlas diesel engine.
Condition good.
A real bargain $12,450.00.
Freight prepaid to any U. S. location.

One—1½ yd Koehring 601 dragline. A real buy.
One—1½ yd Link-Belt Model K dragline. 65' boom. 1½ yd Hendryx dragline bucket.
One—1½ yd Northwest 6 dragline with 1½ yd Page dragline bucket, Twin City oil burning engine. Price moderate.
One—1¼ yd Lima 101 shovel. We can also offer another Lima same size with shovel and dragline combination.
1¼ yd Bucyrus-Erie GA-2 and GA-3 shovels. We can offer three of these machines—extremely reasonably priced.
One—1¾ yd Byers Master shovel in New Jersey.
One—1¼ yd Link-Belt shovel and dragline combination—Pennsylvania location.
One—1¼ yd Lorain 75A shovel—New England.
One—1¼ yd Marion 352 shovel and dragline—Wisconsin gas engine. Excellent condition.
Three—Northwest Model 104 shovel and dragline combination. Reasonably priced.
Two—Osgood 1¼ yd shovel and dragline combination.
One—Osgood 1¼ yd dragline only.
Two—P&H Model 700—1¼ yd shovel and crane combination.
Three—1 yd Bucyrus-Erie GA2 shovel and dragline combinations.
Two—1 yd diesel 30B Bucyrus—very reasonably priced.
One—1 yd Link-Belt shovel and dragline combination. Good buy.
One—1 yd Lorain Model 55. Can also offer one Lorain 60.
One—1 yd Marion gas electric Model 450.
One—1 yard Marion gas-electric Model 450.
One—1 yd Marion Model 440 with Cummins diesel engine.
Three—Northwest Model 105—1 yd shovel and dragline combinations. Very reasonably priced.
One—1 yd Northwest Model 4 dragline and shovel combination.
One—1 yd Osgood shovel and backhoe. Real bargain.
One—1 yd P&H Model 600 dragline.
One—1 yd P&H Model 600 dragline and shovel combination.

¾ yd. - 1941
One Link-Belt "Paymaster"
Built in 1941.
Shovel and backhoe combination.
Could also supply a crane boom.

One—¾ yd Browning crane.
One—¾ yd. Buckeye crane—late model.
One—¾ yd Model 1030 Bucyrus-Erie shovel and crane.
Two—¾ yd Koehring Model 301 shovel-backhoe combinations.
One—¾ yd Link-Belt dragline.
One—¾ yd Lorain Model 45 shovel and crane.
One—¾ yd Lorain shovel and dragline Model 40.
One—Northwest ¾ yd Model 3 shovel and crane combination.
Two—Osgood ¾ yd dragline and shovel combinations.
One—¾ yd P&H Model 400 shovel and crane.

One 1940 ½ yd. Bay City Model 30
Heavy duty ½ yard Shovel,
crane and backhoe combination.

One—½ yd Bay City Model K shovel and crane.
One—½ yd Bucyrus-Erie 10B shovel and crane combination.
One—½ yd. Byers "Bulldog" type crane. Rebuilt.
Two—General ½ yd shovel and backhoe combinations.
One—½ yd Insley Model R full swing shovel and backhoe.
One—½ yd Insley Model K-10 shovel and crane—1939-40 model.
One—⅝ yd Speeder shovel and crane.
One—⅝ yd Northwest Model 2 shovel.
One—⅝ yd P&H dragline.
One—⅝ yd. Model 300A P&H shovel and crane comb.
One—½ yd Unit shovel and crane combination.
One—⅜ yd Universal full swing shovel.
Two—Bay City ¾ swing—⅝ yd shovel and crane combinations.
One—⅜ yd Insley ¾ swing shovel and backhoe.
One—⅜ yd Byers Model 40 shovel. Trailer goes with the machine.
One—⅜ yd Byers Bearcat shovel.
One—⅜ yd Fundum shovel.
An exceptionally good selection of all types of shovels, cranes and draglines will be presented to you if you will phone, wire, or write to—

ECONOMY COMPANY, INC.

49 Vanderbilt Ave., New York, N. Y. **Tels. MUrray Hill 4-2294-8292-2295-2296**

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31 1-4-T.
1— 6 ton, 30B, 43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44" as is 5 ton 825, 44" & 36"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839
Battery Locomotives G.E., Ironton and Atlas.

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt.
1—Jeffrey. MH 100, frame only.

MINING MACHINES

Jeffrey. 35B and 4—28A, 250 V. 4—29B, 29C. 29CE with shearing head.
Revolving head for 29C.
Goodman. 12A, 12AB, 12AA, 12G3A, 24B.
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA.
2—124 E.J.
Motors for 212AA, both 250 and 500 volts.
Sullivan, CE7, CE9, CE10. CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW G.E. Rotaries (600 volt).
2—150 KW West. Rotary.
1—200 KW 1—100 KW Ridgway M-G Sets.
2—100 KW G.E. Rotary.
1—100 KW Allis-Chalmers Rotary.

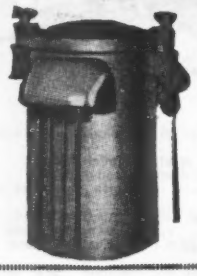
SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. Goodman 34B, 30B, 30C, 12A, 12AB, 12AA, 33-1-4-T, 31-1-4-T. General Electric 801, 803, 819, 821, 825, 839. Westinghouse 904, 906, 102, 907, YR2, 115. Also 200 KW Westinghouse Rotary Converter Armature, 250 V Bracket Type, 150 KW G. E. HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck). 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 24"x24" * ROPE & BUTTON CONVEYOR 400' long * LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC 3-60-440, 1 ton and 2 ton * 1 clam shell bucket 1¾ cubic yard. 1—Figure 8 drum * MINE CARS * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine.

GUYAN MACHINERY COMPANY, Logan, W. Va.

—TRANSFORMERS—



BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M. Since 1912 CINCINNATI 27, OHIO

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.

300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.

150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

300 KW WEST. SYN., 275 V., 2200/4000 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.

200 KW G.E., Ind. 600 V. 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHSE., 500 V., 908-C Mts., 36"-44" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 500 V., 906-C Mts., 36"-48" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY

Incorporated

501 Grant Building Pittsburgh, Pa.

ELECTRIC LOCOMOTIVES

1—13 Ton GE with HM-829 motors.
1—10 Ton GE steel frame, 250 V, HM-830A motors.
1—6 Ton West. bar steel frame, with 904-C 250 V motors.
1—6 Ton Jeffrey, MH-88 motors, any gauge.
2—6 Ton GE with HM-823 motors.
1—5 Ton GE ready to operate, 42" gauge.
2—5 Ton Goodman 250 V, 36" ga.
1—4 Ton Jeffrey MH-96 motors.

COAL CUTTING MACHINES

1—124EJ Goodman, 50 HP, 250 V, permissible track mounted slabbing machine.
1—35B Jeffrey 250 V shortwall.
1—35BB Jeffrey AC shortwall.
1—35B Jeffrey 500 V shortwall.
1—12DA Goodman, 50 HP, 250 V, D.C.
1—12G3 Goodman, shortwall, 3/60/220 V, A.C.
1—12AB Goodman shortwall, 250 V, D.C.
1—36B Jeffrey, 250 V, 14" high.

MISCELLANEOUS

1—165 HP GE Syn. 2200 V, 900 RPM motor.
1—150 KW Syn. M-G set, 250 V.

Send us a list of any equipment you may have for sale.

TIPPINS MACHINERY CO.

PITTSBURGH 13, PENNSYLVANIA.

MINE HOISTS

1—Wellman, Keyed Drum, 60" Dia. will coil 4500 ft. 1" rope. 200 or 300 H.P. Motor with Magnetic Control.

1—Vulcan, Shaft Hoist, 72" Dia. Suitable 300 ft. Shaft. Motor with control to suit requirements.

1—Nordberg, Shaft Hoist, 72" Dia. Suitable 200 ft. Shaft. 150 H.P. Motor with Control.

1—Vulcan, Cylindro-Conical, Shaft Hoist. Drum 7'-9' Dia. Suitable 350 ft. Shaft. 400 H.P. Motor with Control.

Other Hoists available to suit all mining conditions.

JONES MINING EQUIPMENT CO.

Empire Building Pittsburgh 22, Pa.

450 MINE CARS

Composite, electric welded, rotary dump type. Toncan steel, white oak bottom. Timken roller bearings, square alloy steel axles, 14" wheels. 4 wheel brakes. Gauge 44". Overall length 131", body 110", width 68", Wheelbase 36". Height above rail 42". Capacity 120 cu. ft. level. Swivel type hitchings.

These cars in service now, are offered subject to release August 1st, located within 20 miles Pittsburgh.

JONES MINING EQUIPMENT CO.

Empire Building, Pittsburgh 22, Pa.

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Penna.

ELECTRIC Welding rods, coated. New, packed in original boxes.
Sizes:
5/32 inch.. 8000 lbs. 1/4 inch..20000 lbs.
3/16 inch..17000 lbs. 5/16 inch..14000 lbs.
Popular brands, like "Fleetweld", "A. O. Smith", "Arcway", "Sureweld", "General Electric", at .03½¢ lb. Kindly write for list.

AMERICAN SALES CO.

1562 Harrison Ave. Cincinnati 14, Ohio

FOR SALE

52 ft. Fairfile, dragflight, all steel self supporting coal elevating conveyor, cap. 125 TPH, Price $750 incl. 15 HP 3PH motor.

HOWARD PRINCE

Franklin, Ind.

16 YD. DRAGLINE:
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom.
AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted 360, 676, 870, 1000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric 1300, 1,500, 2200, 5000 ft.
(14) Gasoline, 10, 160, 220, 210 & 370 ft.
RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"
TANKS:
12,000 and 15,000 gal. and 20,000 gal.
CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 48 In. Large stock here.
STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.
DIESEL GENERATOR:
480 KW 3-60-2300 v. Cooper Bessemer
TROLLEY LOCOMOTIVES:
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8, 4x10
2 Robins Gyrex 4x8½
4x12 Niagara. 3x8 L. B., 5x8 Simplex
CARS:
6—Western 16-20-30 yd. Side Dump
30—50 ton Gondolas
12—50 ton Flat Cars
100—8000 & 10,000 gal. Tank Cars
SHOVELS, CRANES & DRAGLINES:
2 yd. Monighan 60' Boom Walker
2 yd. P & H Model 780 75' Boom Diesel Dragline
2—2¾ yd. 48B Diesel Shovel—Draglines
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
2—120B—4 yd. Elec. Shovel—Dragline
25 ton Browning 50' Boom Loco. Crane
MINE LOADERS:
H23 Sullivan Tunnel Loader
3—5 BU & 7 BU & 12BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers
5—Gardner Denver & Eimco Shovels
MISCELLANEOUS:
5'x60' Traylor Rotary Dryer
Clamshell Buckets ¾, 1, 1½, & 2 yd. Cap.
30 ton & 12 ton Vulcan St. Ga. Gas. Loco.
67 ton Gas. Elec. Locomotive
WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers, Mine Loaders

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

LATHES

36" x 24' American Grd. Hd. Two Carriages, Q.C.
27" x 16' Lodge & Shipley Grd. Hd. Taper—

RADIAL DRILLS

6' American Triple Purpose, M.D.
6' Cincinnati Bickford Radial M.D.
7' Cincinnati Bickford Radial M.D.
5' American Triple Purpose Plain.

CINCINNATI MACHINERY & SUPPLY COMPANY
218 E. Second St., Cincinnati, Ohio

IRON and STEEL PIPE

New and Used

Large stocks, all sizes attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.

REBUILT MINING EQUIPMENT

MOTOR GENERATOR SETS
1—100 Kw Ridgway Synch. Motor Generator Set 275 Volts DC. 3/60/2300 Volts AC, 1200 RPM with AC & DC Switchboards

JOHN D. CRAWBUCK CO. PGH. (12) PA.

NEW AND GUARANTEED
Used Steel Pipe and Boiler Tubes

Steel tanks—steel buildings
all sizes and kinds
Valves and fittings.

JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yds., St. Clair Co., Ill.

FOR
IMMEDIATE DELIVERY
OF
RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE

I.D. Size	Each Length with Couplings Attached	
	Length	per Length
¾"	25 feet	$4.25
	50 "	8.00
1"	25 "	6.25
	50 "	12.00
1¼"	25 "	7.50
	35 "	10.50
	40 "	12.00
	50 "	15.00
1½"	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE NEW YORK, N. Y.

PIPE—MACHINERY—GAS ENGINES AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO **Near Toledo**

PIPE New & Reconditioned

ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS

UNITED PIPE & SUPPLY CO. Department 110 NORRISTOWN, PA.

FOR SALE

HOISTS

1—Shepard Niles Electric Hoist to raise loading boom conveyors, capacity 2000#, 5 HP, 3 ph, 60 cy, 440 volts, with controls.

1—Ottumwa electric hoist, single rigid cylindro-conical drum, with automatic control, Weight of cage 7000#, Weight of Car 2500#, Weight of Coal 6000#, Lift 310 ft., diameter of rope 1¼". Diameter of drum 60" x 84". Brake, 84" diameter, 8" face, post type, oil operated. Drum shaft bearings 10" x 20". Hoist is equipped with single reduction gears 19 and 229 teeth, 2½ D.P. 11" face. The drum has five grooves on the 60" diameter, 11 grooves up the cone, 4 grooves on the 84" diameter. The drum has a rope capacity of 326 feet plus three dead turns. The hoist is equipped with a 200 HP motor.

1—Ottumwa Electric hoist, single rigid conical drum type, with single reduction herringbone gear, the pinion running between two bearings and connected with motor by flexible coupling. Weight of coal 4000#, Weight of car 1800#, Weight of cage 4000#, total cage travel 210 ft, size of rope 1⅛". End lift. The hoist is equipped with a 150 HP motor.

MINING MACHINES

4—Goodman Universal Shortwall mining machines, 112AA, 6 ft. cutter bars, 50 HP motors, DC, 250 volts, 36" or 42" gauge.

1—Goodman Universal Shortwall mining machine, 112DB, DC, 250 volts, Cincinnati Duplex chain, 6 ft. cutter bar. Has new extra armature, 36" or 42" gauge.

6—Goodman Standard Shortwall mining machines, 12AA, 250 volts, DC, 6 ft. cutter bars, 36" or 42" gauge.

3—Goodman Longwall mining machines, DC, 36" or 42" gauge.

7—Jeffrey 35A Shortwall mining machines, 50 HP motors, 250 volts, DC, 6 ft. cutter bars, 36" or 42" gauge.

3—Sullivan CE-7 Shearing machines, 250 volts, DC, 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CE-7 Shearing machine, AC, 220 volts, 3 ph, 60 cy, 7 ft. cutter bars, 36" or 42" gauge.

1—Sullivan CE-7 Shortwall mining machine, AC, 220 volts, 3 ph, 60 cy, tip-turn truck, 7 ft. cutter bar, 36" or 42" gauge.

LOCOMOTIVES

3—Goodman 5 ton locomotives, type WI-2A5, 36" or 42" gauge. One is complete with electric reel.

2—Goodman 6 ton ball bearing locomotives, type 3314T, 36" or 42" gauge.

1—General Electric Co. 8 ton ball bearing locomotive, HM-839A motors, 36" or 42" gauge.

1—Westinghouse 8 ton locomotive, cast iron frame, 36" or 42" gauge.

1—Jeffrey 5 ton locomotive, cast iron frame, 36" or 42" gauge.

CRUSHERS

2—Jeffrey Crushers, single roll, size 30 x 30.

1—Jeffrey, rotary ring, single roll crusher, 24x36, with 50 HP ball bearing, enclosed motor, 1200 rpm no load, 1155 rpm full load, V-belt driven. Crushes from 20" lump down to ⅛" stoker coal.

AERIAL TRAM

1—B & D, 60 cubic feet automatic dump bucket aerial tram with 1200 feet of 2" interlocking cable and drive.

PIT CARS

120—Timken roller bearing cars, 8' overall length, bumper to bumper, 4'3" overall width, 2'5" overall height, 18½" wheelbase. End dump. One link and pin, 36" gauge.

CENTRIFUGAL PUMP

1—Platt Centrifugal pump, size 5, 4 stage, 500GPM, 359' head.

CONVEYORS

6—Goodman shaker conveyors, type E, complete with pans.

STEEL TIPPLES

1—Tipple and shaker constructed by Allen and Garcia Company. Capacity 3000 tons daily.

2—Tipples—smaller capacity than the one listed above.

Have new and second hand rails and track accessories.

We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS

CANTON, ILLINOIS

Equipment For Sale

1—Traylor Gyratory Crusher, First Class Cond., Size #410 T.Z. Serial No. 27784.
1—Willey D. C. 50 K. W. Generator direct connected to Ridgeway Steam Engine, 125 V, 400 Amp.
1—Starting Compensator, No. 856644, Type #NR2040, Form A3, Volts 2300 for Synchronous Motor, ATI KVA150, Cycles 60, Phase 3, G. E.
1—25 x 40 Cedar Rapids roller bearing jaw crusher 42" x 8' apron feeder (Iowa).
1—Lippman Pulverizer 24" x 18" feed opening 10 x 10 RPM 1200 to 1800 HP 30 to 45 Capacity 4½ to 13 tons per hour—9 to 23 tons 1" or larger.

Following D. C. Electric Motors:
1—Jantz & Liest Motor, 20 H.P., 110 V, 1050 RPM, Serial #1320.
1—Emerson Motor, 1 H.P. 115 V, 1750 RPM, Serial #P78608.
1—Emerson Regulating Starter, Cutler Hammer.
1—Emerson Motor, 1 H.P. 115 V. 1750 RPM, Serial #78607.
1—Emerson Regulating Starter, G.E.
1—Allis Chalmers Motor, 20 H.P. 110 V, 1000 RPM, Serial #7DK28.
1—Allis Chalmers Starter & Switch.
1—Jantz & Liest Motor, 7½ H.P., 110 V, 900 RPM Serial #1211.
2—10' Sturtevant Air Separators.

THE KENTUCKY STONE COMPANY, INC.
1616 Heyburn Bldg. Louisville 2, Ky.

FOR SALE

8—HOISTS 250 V. D.C. MOTORS

2—Vulcan 48 inch Drum 125 HP Motor
1—Vulcan 32 inch Drum 50 HP
1—Vulcan 28 inch Drum 35 HP
1—Vulcan 18 inch Drum 25 HP
1—Vulcan 27 inch Drum 50 HP
2—Vulcan 24 inch Drum 35 HP

5—Sullivan CE-7 Cutting Machines 250 Volt
200—Rebuilt 2¼ Ton Card Iron Works Mine Cars Timken Bearing Equipped, 36" ga.
50—C. S. Card style 372 Sheaves, Complete
Will Sell Hoists and Motors Separately!

HAYDEN COAL COMPANY
920 First National Bank Bldg.
Denver 2, Colorado

SPECIAL OFFERING

85

50-TON ALL STEEL SIDE DISCHARGE HOPPER CARS. 1831 cu. ft. CAPACITY. CAST STEEL SIDE FRAMES.

PROMPT DELIVERY

IRON & STEEL PRODUCTS, INC.
40 years' experience
13484 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

18P'S popular Scripto Pencil sent to all responders.

COAL CUTTING MACHINES

11—CE-7 Shortwall AC Coal Cutters, 30 H.P. Motors, 7½ Ft. Cutter Bars, Standard Chains, with Tip-turn Trucks. Location near Springfield, Illinois.

We have just purchased the above machines together with approximately $5,000.00 worth of new parts. Four of these Coal Cutters have been overhauled and we can sell at bargain prices if purchased before moving to Colorado.

Write for Bulletin No. 7

Florence Machinery & Supply Co.
904 Equitable Bldg., Denver 2, Colorado
Yards & Warehouses at Denver & Florence

75 NEW BRONZE ALLIS-CHALMERS PUMPS

Priced at Fraction of Original Cost. Immediate Delivery. *No Priority Needed.*

All bronze, ball bearing, centrifugal pump units consisting of two pumps on one shaft; setup for either direct drive or pulley drive. These are marine type pumps for salt and fresh water, but can be used for chemicals, foods, distilleries, etc. Without motors. Sizes: 3", 3½", 4", 4½" and 5". Unit weighs approximately 350 pounds. G.P.M. 350 to 600, FT. HD. 60 to 90, R.P.M. 3300. Photo and specs sent on request.

AMERICAN SALES COMPANY
1562 Harrison Ave. Cincinnati 14, Ohio

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SET

1—200 kw. West. 600 v. DC 900 rpm Gen. direct. driven through common shaft by 1—290 HP 440 v. 3 ph 60 cy. West. Syn. Motor.

ROTARY CONVERTERS

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.
3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.
1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

1—5 ton Ironton Storage Battery Locomotive.
3—5 ton Goodman 30 B 250 v. 36" ga.
1—5 ton Goodman 2600R Gathering Locomotive, 250 v. DC 42 or 44" ga. with cable reel.
1—10 ton Goodman Haulage or Gathering Locomotive, 250 v. 42" ga. Inside wheels.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, two motor type: single end control.

PUMPS

1—American Piston Pump, intake 5½", discharge 4½", size 8x12.
1—90 GPM 225 ft. head, 600 rpm. 2x2" Blackmer Pump.
1—220 GPM 225 ft. head, 600 rpm. 3½"x3" Blackmer Pump.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	I	440	900
260	Burke	EMV-65	440	600
260	Burke	EMV-65	2200	600
150	West.	CW	220/440	490
100	West.	CW	220/440	900
75	West.	CW	220/440	900
75	West.	CW	220/440	720
60	West.	CW	220/440	720
50	West.	CW	220/440	720
50	Chand.		220/440	1800
50 new	West.	CW	220/440	860
30	West.	CI	220/440	787
30	West.	CW	220	900
15	West.	CW	220	870

230 V. DC MOTORS

HP	Make	RPM	Type
1½	Westg.	2200	SK
1½	Westg.	900	CD
1½	Robbins Myers	1750	
1½	Master	3450	DM
2	Northern	1000	
2	Reliance	850	
3	West.	860	CD
3	G.E.	1250	RC-26A
3	G.E.	1150	RC-26A
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
15	G.E.	1800	RC-9
20	Lincoln	720	
25	Lincoln	900	
30	Lincoln	1200	
75	West.	225	
85	West	450	S
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
35	G.E.	900	DLC

TRANSFORMERS—1 ph. 60 cy.

No.	Kva.	Pri	Sec.	Make
1	2	1040/2080	52/104	G.E.
1	2	6600	110/220	G.E.
1	2½	1040/2080	52/104	G.E.
2	3	2200/2100/2000	440/220/110	West.
1	3	2200	110/220	G.E.
1	5	2000/4000	80	West.
3	5	2200	220/440	G.E.
4	5	2200/1100	110/220	G.E.
1	5	2200	110/220	West.
4	5	2200	110/220	G.E.
1	7½	2200	110/220	West.
69	7½	1100/2200	110/220	G.E.
29	7½	2200/1100	110/220	West.
8	7½	2200/1100	440/220/110	West.
6	10	2200/1100	220/110	West.
10	10	2200/1100	220/110	G.E.
2	10	2300	220/110	G.E.
1	10	2200/1100	440/220/110	West.
21	15	2200/1100	440/220/110	West.
3	15	2200	220/440	G.E.
2	15	2300	230/460	American
3	15	2200	110/220	Packard
3	15	2200	110/220	Cr. Wh.
16	18	220	19½/38½	Elec. Furnace
2	20	1150/2300	115/230	Maloney
2	20	2300	230/460	American
1	20	2300	110/230	West.
2	20	2200/1100	440/220/110	West.
2	25	2300	230/460	American
2	25	2300	110/220	West.
3	40	2200/1100	220/110	West.
1	40	1100/2200	110/220	Pittsburgh
1	40	2300/1150	115/230	Maloney
2	50	2200	110/220	Packard
1	50	6600	550/440	Allis Chal.
1	50	2200/1100	220/110	West.
2	50	2200/1100	220/110	Maloney
3	75	2300	206–103 Rotary	G.E.
1	100	2300	230/115	Standard
3	125	2200	220/440	G.E.
2	150	2200/2300/2400	220/230/240	G.E.
3	250	6600/5940	2300	West.

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7530.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

DIESEL ENGINE GENERATOR SET

1—40 kw. 250 v. DC Gen. belt driven by 65 HP Primm Diesel Hor. Engine.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

FOR SALE

One Goodman Standard Shortwall

CUTTING MACHINE

Completely overhauled with new feed drum and shaft, A.C. 220 V., 60 cycle, 3 phase for 36" gage track. Has about 200 ft. cable and 50 ft. hand cable with reel trucks. Machine guaranteed to be in A-1 condition. Stator coils, brand new, dipped and baked.

Wanted to Swap: Two Universal Goodman, tiptable cutting machine trucks (42" gage) in good condition, for two Universal Goodman low-vein, Stub axle (36" gage) trucks. The low-vein trucks must be in good condition, and we will trade even. Will buy out-right if no trade is wanted.

RICHARDSON COAL CO.
Linton, Ind.

NEW DIESEL-GENERATORS
WE OWN AND CAN SHIP IMMEDIATELY

2—New Caterpillar D13000 diesel engines with electric starting equipment, direct connected to new 75 KW generators each with new 20 KW top mounted, belted generator, complete with instruments, batteries, spare parts, etc. No priority or release required.

L. B. SMITH, INC.
Camp Hill, Pa. Harrisburg 7331

FOR SALE

USED MINE CAR TRUCKS

44" and 48" Gauge Timken and Hyatt Bearings

200 Used Steel Mine Cars End Dump 44" Gauge. 4/0 Round Copper. Reasonable Prices for Quick Sale.

MANSBACH METAL COMPANY
Logan, W. Va. Phone 1071

SHOVELS & DRAGLINES

Lorain 40 Combination ¾ yard combination shovel and dragline. Rebuilt and guaranteed.

Model K-48 Link Belt Dragline 75' boom, 2 yard Page Bucket. Caterpillar diesel engine. Rebuilt & guaranteed.

Osgood 1½ yd. combination diesel shovel and dragline. Dragline boom 60'. Rebuilt and guaranteed.

1001 Lima dragline. 80' boom. 2½ yd. bucket. Hesselman oil engine. Rebuilt & guaranteed.

FRANK SWABB EQUIPMENT CO.
HAZLETON, PA. PHONE 3906

BONDED SCALES, VIBRATING SCREENS, CRUSHERS

15 ton, 22' x 9' Truck Scale	$ 440.00
20 ton, 24' x 10' Truck Scale	$ 575.00
20 ton, 34' x 10' Truck Scale	$ 815.00
26 ton, 24' x 10' Truck Stle	$ 642.00
33 ton, 34' x 10' Truck Sale	$1040.00
40 ton, 40' x 10' Truck Scale	$1565.00
3 ton Tipple Scale	$ 135.00
3' x 6' Single Deck Screen	$ 495.00
3' x 8' Double Deck Screen	$ 685.00
3' x 8' Single Deck Screen	$ 585.00
3' x 8' Three Deck Screen	$ 885.00
Double-Roll Coal Crusher	$ 345.00
Large Double Roll Crusher	$ 795.00
Portable Power Bag & Stacker	$ 600.00

We manufacture over 100 models of scales, vibrating screens, crushers, conveyor stackers. More than 1500 mines have our equipment. Immediate delivery. Write, phone or wire for catalog and prices.

BONDED SCALE COMPANY, MFRS.
2190 S. Third St., Columbus 7, Ohio

TOP CUTTING MACHINE

1—Goodman type 724 E J 250 volt. 9 ft. Cutter Bar with two chains, adjustable from 35" to 77" cut.

JONES MINING EQUIPMENT CO.
Empire Bldg. Pittsburgh 22, Pa.

FOR SALE REASONABLE

MONIGHAN WALKING DRAGLINE

with 1¾ yd. bucket. Electric powered. Can be converted to use gas power if desired.

NEW ENGLAND EQUIPMENT CO.
One Howe Street East Brookfield, Mass.

Bucyrus-Erie 50B steam 2 1/3 yd. shovel, #10635. 26' boom, 17' sticks, manganese rock dipper, steel cab; 100% rebuilt; guaranteed; (Sept.).
Porter 18-ton & **Vulcan** 17-ton steam 36" gauge S/T locomotives, 100% rebuilt, tested.
Milwaukee 8-ton gas locomotive, 36" ga., A-1.
Vulcan 18-ton steam S/T locomotive, 42" gauge.
Whitcomb 8-ton gas locomotives (4), 24" gauge.
Baldwin and Lima steam locomotives, 58, 56, 50, 42 and 40 tons, std. gauge (5).
Locomotives, gas-elec., std. ga., 42 & 65 tons.
Marion 1¼-yd. shovel, gas-electric.
Marion electric 4-yd. & 3-yd. shovels.
Draglines, 2 & 3-yd. Diesel, electric.
P&H 206B crane, gas, 40' boom, ¾-yd. bkt.
American steam railway ditcher-crane, 28' bm.
Fairbanks Morse 240 HP Diesel engine, Model 44.
Euclid 6-yd. bottom dump crawler wagons (8).
Bucyrus 30' shovel boom only, for 50B machine.
Boiler tubes, 236-1¾"x5', ferrules (new).

H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

COAL AGE ADVERTISERS IN THIS ISSUE

An asterisk preceding manufacturer's name indicates detailed information may be found in the 1944-1945 *MINING CATALOGS*

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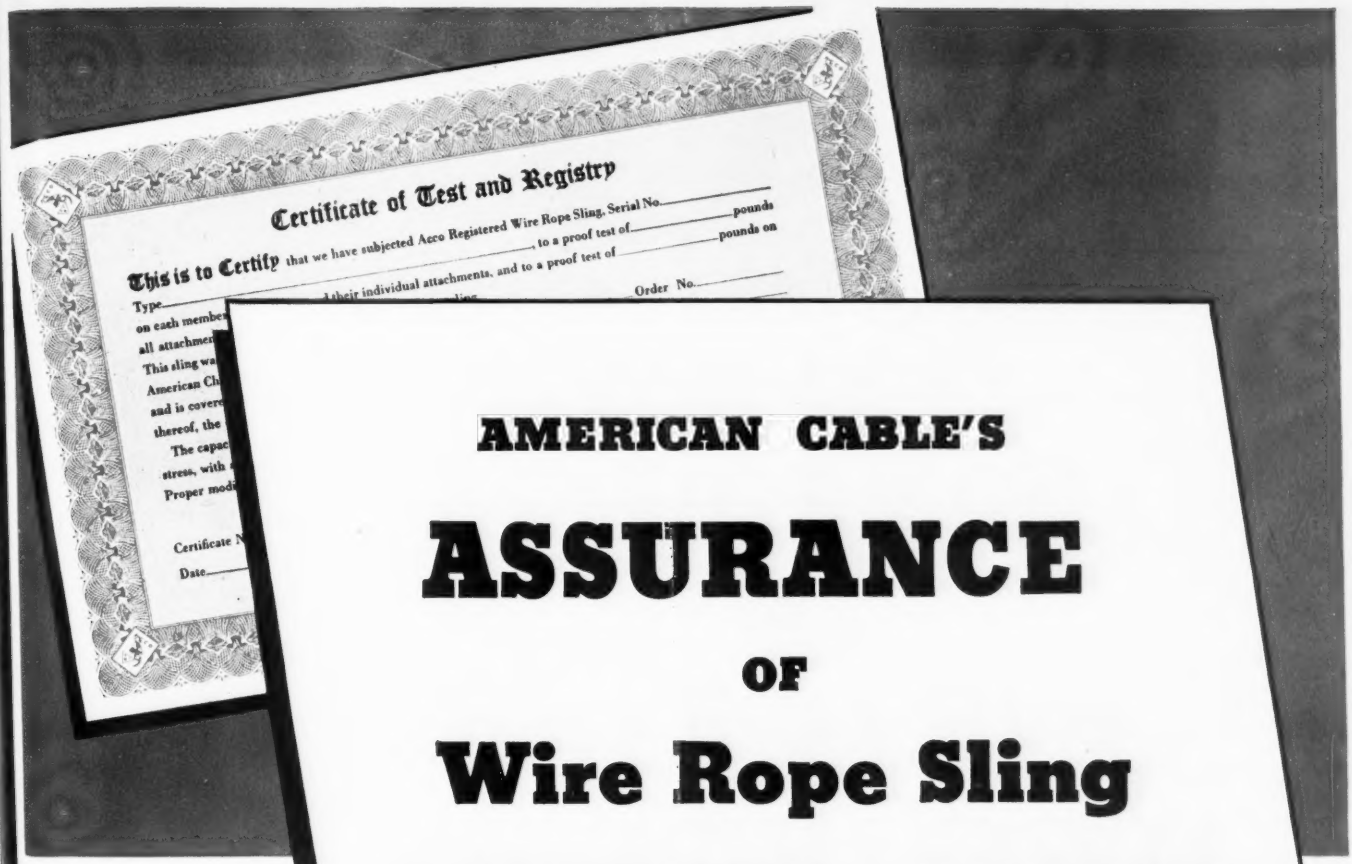
SEARCHLIGHT SECTION

Classified Advertising



AMERICAN CABLE'S

ASSURANCE

OF

Wire Rope Sling

STRENGTH & SAFETY

• Now you may have registered assurance—a Certificate of Test and Registry—with your wire rope sling.

American Cable proof-tests every Registered Sling to twice its rated capacity. Then, as proof of known strength and safety, you may have your sling **ACCO-Registered** and receive a Certificate showing the actual proof-test load, maximum safe load and date of testing. Only the highest grade wire rope (TRU•LAY Preformed of Improved Plow Steel) is used to make American Cable's **ACCO-Registered Slings.**

ACCO-Registered Service helps you select the right sling for your particular job; then registers and identifies its pre-determined strength. Send today for your free copy of the book on **ACCO-Registered Sling** Service.

ACCO

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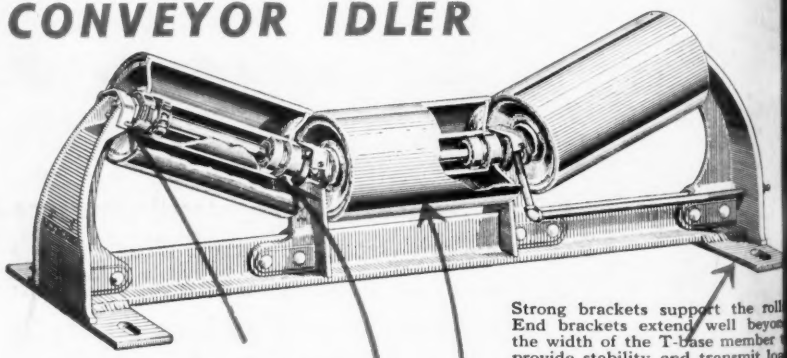
AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

IT'S THE ENGINEERING OF EACH PART THAT GIVES YOU THAT "*Extra*" *in Service*

THE *NEW*, *IMPROVED* LINK-BELT TYPE "100" *BELT CONVEYOR IDLER*



● Top performance in belt conveyors depends, in great measure, on the structure on which the load moves. LINK-BELT Roller Bearing Belt Conveyor Idlers are the outgrowth of almost 50 years of constant development. Engineering that progressed to keep ahead of growing service needs has achieved outstanding design in today's LINK-BELT IDLERS.

You can depend on them, and there is every reason why, to require minimum power and maintenance — to perform smoothly and dependably and to add to the ordinary life of belts.

Interlocking nuts and yokes prevent brackets from spreading — the hexagonal end-nuts interlock with bracket yokes so that roll shafts actually tie all brackets together.

Strong brackets support the roll... End brackets extend well beyon... the width of the T-base member ... provide stability and transmit loa... directly to rigid steel feet. Cente... brackets straddle the full width ... the horizontal self-cleaning ste... Tee-Bar.

POSITIVE GREASE SEAL keeps grease in and dirt out—conserves lubrication—prolongs bearing life. No springs, no loose parts, no sliding metal-to-metal contact.

Rolls are accurately aligned in a sturdy streamlined frame assembled in jigs ... assure correct bracket spacing and ro... interchangeability.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

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Book No. 1915 gives full particulars

This 16-page book is packed with detailed information on LINK-BELT Belt Conveyor Idlers and the various types available in the "100" series. Drawings are shown with tables giving list prices, dimensions in inches, and weights in pounds. Write today for this book.

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